02P01318

PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

83

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : A61K — A2

(11) International Publication Number: **WO 99/16407**

(43) International Publication Date: 8 April 1999 (08.04.99)

(21) International Application Number: PCT/US98/20239

(22) International Filing Date: 29 September 1998 (29.09.98)

(30) Priority Data:
08/940,064 29 September 1997 (29.09.97) US

(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application
US 08/940,064 (CIP)
Filed on 29 September 1997 (29.09.97)

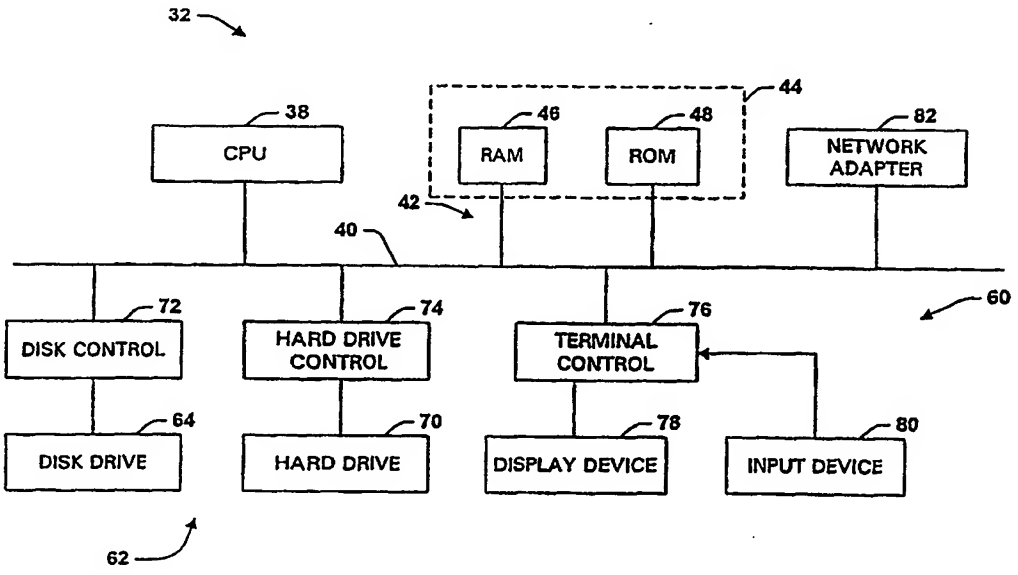
(71)(72) Applicant and Inventor: ROSS, Edgar, L. [US/US]; 26300 Bernwood, Beachwood, OH 44122 (US).

(74) Agent: SKLAR, Warren, A.; Renner, Otto, Boisselle & Sklar, P.L.L., 19th floor, 1621 Euclid Avenue, Cleveland, OH 44115 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
Without international search report and to be republished upon receipt of that report.

(54) Title: METHOD AND SYSTEM FOR PAIN MANAGEMENT



(57) Abstract

A system and method for facilitating chronic pain management. A methodology is employed which includes determining the type of disease or chronic pain a patient is suffering from. A determination is made as to what treatments the patient has already undergone in treating the disease and/or chronic pain and what treatments the patient still needs. Based on the above determinations, the present invention formulates a treatment plan for the disease and/or chronic pain and employs historical data to forecast the likely outcome of the treatment plan, the length of the treatment, the associated costs and risks along with the log–term costs, patient function and the effectiveness of long–term therapy and the ongoing supportive needs of the patient.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania
AM	Armenia
AT	Austria
AU	Australia
AZ	Azerbaijan
BA	Bosnia and Herzegovina
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
BY	Belarus
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CN	China
CU	Cuba
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GE	Georgia
GH	Ghana
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IL	Israel
IS	Iceland
IT	Italy
JP	Japan
KE	Kenya
KG	Kyrgyzstan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakstan
LC	Saint Lucia
LI	Liechtenstein
LK	Sri Lanka
LR	Liberia
LS	Lesotho
LT	Lithuania
LU	Luxembourg
LV	Latvia
MC	Monaco
MD	Republic of Moldova
MG	Madagascar
MK	The former Yugoslav Republic of Macedonia
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
MX	Mexico
NE	Niger
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SG	Singapore
SI	Slovenia
SK	Slovakia
SN	Senegal
SZ	Swaziland
TD	Chad
TG	Togo
TJ	Tajikistan
TM	Turkmenistan
TR	Turkey
TT	Trinidad and Tobago
UA	Ukraine
UG	Uganda
US	United States of America
UZ	Uzbekistan
VN	Viet Nam
YU	Yugoslavia
ZW	Zimbabwe

Title: METHOD AND SYSTEM FOR PAIN MANAGEMENT

Technical Field of the Invention

The present invention relates generally to a system and method for treating a patient, and more particularly to a system and method for facilitating chronic pain management.

Background of the Invention

The U.S. medical health care system is facing a crucial point in its evolution. The escalating costs of health care, marked variations in the practice patterns of physicians, the increasing number of uninsured and/or underinsured individuals and the dissatisfaction of the public with the current health care system in this country have all contributed to the crisis currently faced by health care benefit providers.

The structure of organizations responsible for providing medical insurance benefits has shifted over the course of time from local providers to more complexed managed health care systems of providers. The administrative structure developed to support health care providers has also grown more complex and has assumed oversight responsibilities.

Due to the geometric escalation of medical care costs, there is increased pressure on public policy makers to establish cost containment programs. For this reason, state and federal governments are beginning to adopt various case specific or case-mix reimbursement systems. The Social Security Amendments of 1983, (Public law 98-21), introduced a diagnosis specific prospective payment system that has been incorporated into the Medicare reimbursement policies. Under this system, the amount of payment for a patient hospital stay is determined by one of hundreds of defined Diagnostic Related Groups ("DRGs") into which the patient stay is categorized based upon diagnosis and procedures performed. Hospitals are reimbursed according to a fixed schedule without regard to actual costs to the hospital in rendering medical services to the patient.

The DRGs represent a statistical, clinical classification effort to group together those diagnoses and procedures which are clinically related and have similar resource consumption. A DRG that is appropriate for a given hospital stay is selected, under the reimbursement system, by a particular set of patient attributes which include a principal illness diagnosis, specific secondary diagonsis, procedures performed, age, sex and discharge status (*i.e.*, how the patient left the hospital, whether the patient was transferred, discharged, died, etc.). The principal diagosis is that what caused the patient to be hospitalized, even though the patient may have even more serious problems, as would be indicated by secondary diagnosis. If a surgical procedure is performed, the DRG is determined primarily by that procedure. If no procedure is performed, the DRG is determined primarily by that procedure. The treatment of a patient during a single hospital stay is classified in only one DRG.

Although the DRGs are a step in the right direction, they do not provide a comprehensive methodology to treat patients and predict the associated costs, which may also occur on an outpatient basis.

The aforementioned problems are compounded by the difficulty in treating a patient with respect to proper diagnosis, organization of core functional groups responsible for duties related to treating the patient, and the avoidance of employing unproductive and/or redundant treatment procedures on a patient. The inefficiencies resulting from the above substantially contribute to the problems associated with treating a patient, optimizing efficiency of the organization responsible for treating the patient, and forecasting the likely outcome of a treatment procedure and the costs associated therewith.

Accordingly, there is a strong need in the art for a system and method for treating a patient which avoids redundancy in treatments, optimizes the treatment process, provides healthcare providers and insurers with good forecasting as to the likely outcome of the treatment, the length of treatment and the associated costs.

Summary of the Inventi n

The present invention relates to a system and method for treating a patient, and more particularly to a system and method for facilitating chronic pain management. The present invention provides for a methodology which includes determining the type of disease or chronic pain the patient is suffering from. The invention further determines what treatments the patient has already undergone in treating the disease and/or chronic pain. Based on the above determinations, the present invention formulates a treatment plan for the disease and/or chronic pain and forecasts the likely outcome of the treatment plan, the length of the treatment, the associated costs along with the long-term costs, patient function, the effectiveness of long-term therapy and the ongoing supportive needs of the patient, and provides data to optimize organization.

By employing historical data relating to the determined disease and/or chronic pain a streamlined treatment plan can be instituted which avoids unproductive treatments steps, saves money and expedites curing the patient. As a result of the present invention, treatment of diseases and/or chronic pain is significantly facilitated. Furthermore, the present invention affords for doctors, hospitals and insurance companies to determine with substantially greater precision the cost and length of a particular treatment plan. In particular, the present invention provides for a means to filter out among a plurality of treatment plans the optimal treatment plan for a patient. This filtering aspect along with providing for good prediction of the likely outcome of the treatment and the costs associated therewith affords for increased efficiencies with respect to doctor time, hospital resources and insurance company actuarial analyses among other things.

The present invention further provides for forecasts as to the various risks associated with a given treatment plan. By providing a doctor, hospital and insurance carrier with reasonable predictions as to the results, costs and risks of treatment plans, these entities can collaboratively institute a

treatment regimen which results in a cost effective, results oriented plan with optimal cost/benefit results for a patient.

Moreover, the present invention is applied to various sub-systems (*e.g.*, nursing, non-clinical support, physical therapy, etc.) of a treatment system in order to optimize the various sub-systems (*i.e.*, core functional groups) so that synergies are created when the various sub-systems are combined for treating the patient. In other words, by improving the overall efficiencies of the various sub-systems, the efficiency of the total system is improved.

As a result of the present invention, a patient is provided with an improved treatment plan which may lead to quicker recovery as compared to convention treatment plans, and the efficiencies resulting from the subject invention may ultimately result in reduced medical costs to the patient.

In accordance with one specific aspect of the present invention, a method for treating a patient is provided, including the steps of: assessing the patient's state; planning appropriate treatment for the patient based on the patient's state; and defining the costs of long-term treatment of the patient *via* an outcome oriented approach using historical data relating to the state of the patient.

According to another aspect of the present invention, a system for treating a patient is provided, including: a computer, the computer including: a processor for processing functions relating to the treatment of the patient; a memory operatively coupled to the processor, the memory adapted to store historical data relating to treatment of the patient; wherein the computer is used to plan appropriate treatment for the patient based on the patient's state; and define costs of long-term treatment of the patient *via* an outcome oriented approach using the historical data.

In accordance with another aspect of the present invention, a method for treating a patient is provided, including the steps of: assessing the patient's state; planning appropriate treatment for the patient based on the patient's state; defining the costs of long-term treatment of the patient *via* an

outcome oriented approach using historical data relating to the state of the patient, wherein the long-term costs are defined at inception of the treatment; following the treatment of the patient on a long-term basis and determining the costs associated with follow-up care of the patient prognosing a natural history of a disease of the patient; and defining the long-term costs at inception of the treatment.

According to yet another aspect of the subject invention, a system for treating a patient is provided, including: a computer including a processor for processing functions relating to the treatment of the patient, wherein the functions include: planning appropriate treatment for the patient based on the patient's state; defining the costs of long-term treatment of the patient *via* an outcome oriented approach using historical data relating to the state of the patient, wherein the long-term costs are defined at inception of the treatment; following the treatment of the patient on a long-term basis and determining the costs associated with follow-up care of the patient; prognosing a natural history of a disease of the patient; and defining the long-term costs at inception of the treatment.

Another aspect of the invention relates to a system for pain management, comprising a memory for storing information concerning disease and/or pain, an input for supplying medical information concerning a patient, and a processor for processing functions relating to the medical information concerning the patient and information stored in the memory concerning disease and/or pain.

Another aspect of the invention relates to a method for pain management, comprising storing information concerning disease and/or pain, supplying medical information concerning a patient, and processing functions relating to the medical information concerning the patient and information stored in the memory concerning disease and/or pain.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims. The following description and annexed

drawings set forth in detail certain illustrative embodiments of the invention. These embodiments are indicative, however, of but a few of the various ways in which the principles of the invention may be employed. Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the drawings.

Brief Description of th Drawings

Fig. 1 represents a schematic block diagram of a computer system in accordance with the present invention;

Fig. 2 is a flow diagram representing one specific aspect of patient treatment, data acquisition and correlation of patient demographics and data acquisition in accordance with the present invention;

Figs. 3a-3c is a flow diagram representing one specific aspect of patient treatment with respect to an occupational therapy core functional group in accordance with the present invention;

Figs. 4a-4c is a flow diagram representing one specific aspect of patient treatment with respect to a physical therapy core functional group in accordance with the present invention;

Figs. 5a-5c is a flow diagram representing one specific aspect of patient treatment with respect to a nursing core functional group in accordance with the present invention;

Figs. 6a-6c is a flow diagram representing one specific aspect of patient treatment with respect to a vocational assistance core functional group in accordance with the present invention;

Figs. 7a-7c is a flow diagram representing one specific aspect of patient treatment with respect to a non-clinical support core functional group in accordance with the present invention;

Fig. 8 represents a high level flow chart representative of treating a patient employing a disease specific outcome measured approach in accordance with one specific aspect of the invention;

Figs. 9a, 9b and 9c are a flow diagram representing an aspect of patient treatment, data acquisition and correlation of patient medical information and disease and/or pain information relative to spasticity; and

Figs. 10a and 10b are a flow diagram representing an aspect of patient treatment, data acquisition and correlation of patient medical information and disease and/or pain information relative to pain of auto-immune deficiency syndrome.

Detailed Description of the Invention

As mentioned above, the present invention relates to a system and method for treating a patient, and more particularly to a system and method for facilitating chronic pain management. The present invention provides for a methodology which includes determining the type of disease or chronic pain the patient is suffering from. The invention further determines what treatments the patient has already undergone in treating the disease and/or chronic pain. Based on the above determinations, the present invention formulates a treatment plan for the disease and/or chronic pain and forecasts the likely outcome of the treatment plan, the length of the treatment and the associated costs.

Referring now to the drawings which are for purposes of illustrating the preferred embodiment of the invention only and not for purposes of limiting same. In the drawings, like reference numerals are used to refer to like elements throughout.

Referring initially to Fig. 1, a detailed block diagram of a computer system 32 is shown in accordance with the present invention. According to one specific aspect of the present invention, a personal computer is employed to carry out the present invention. The computer system 32 includes a central processing unit (CPU) 38 which is coupled to a bus 40. The CPU 38 or processor can be any of a plurality of processors, such as the 486DX/33, 486DX2/66, 486DX4/50-100, 486DX4/33-100, 486DX4/33-83, p24T, Pentium 50/75, Pentium 60/90, Pentium 66/100, and Pentium II, and other similar and compatible processors. The processor 38 functions to perform various operations described herein as well as for carrying out other operations related to the system. The manner in which the processor can be programmed to carry out the functions relating to the present invention will be readily apparent to those having ordinary skill in the art based on the description provided herein.

The bus 40 includes a plurality of signal lines 42 for conveying addresses, data and controls between the CPU 38 and a number of other system bus 40 components. The other system bus 40 components include a memory 44 (including a Random Access Memory (RAM) 46 and a Read Only Memory (ROM) 48) and a plurality of Input/Output (I/O) devices 60. The memory 44 serves as data storage and may store appropriate operating code to be executed by the processor for carrying out the functions described herein.

The RAM 46 provides program instruction storage and working memory for the CPU 38. The ROM 48 contains software instructions known as the Basic Input/Output System (BIOS) for performing interface operations with the I/O devices 60. Also stored in the ROM 48 is a software routine which operates to load a boot program from the booting device. The boot program will typically be executed when the computer system 32 is powered on or when initialization of the system 32 is needed.

The I/O devices 60 include basic devices such as data storage devices 62 (*e.g.*, floppy disks 64, tape drives, CD-ROMs, hard disks 70, etc.). Typically, the I/O devices 60 communicate with the CPU 38 by generating interrupts. The CPU 38 distinguishes interrupts from among the I/O devices 60 through individual interrupt codes assigned thereto. Responses of the CPU 38 to the I/O device 60 interrupts differ, depending, among other things, on the devices generating the interrupts. Interrupt vectors are provided to direct the CPU 38 to different interrupt handling routines.

The interrupt vectors are generated during initialization (*i.e.*, boot up) of the computer system 32 by execution of the BIOS. Because responses of the CPU 38 to device interrupts may need to be changed from time to time, the interrupt vectors may need to be modified from time to time in order to direct the CPU 38 to different interrupt handling routines. To allow for modification of the interrupt vectors, they are stored in the RAM 46 during operation of the computer system 32.

A disk control subsystem 72 bidirectionally couples one or more disk drives (*e.g.*, floppy disk drives, CD-ROM drives, etc.) to the system bus 40. The disk drive works in conjunction with a removable storage medium 62 such as a floppy diskette 64 or CD-ROM.

A hard drive control subsystem 74 bidirectionally couples a rotating fixed disk, or hard drive 70 to the system bus 40. The hard drive control subsystem 74 and hard drive 70 provide mass storage 62 for CPU 38 instructions and data.

A terminal control subsystem 76 is also coupled to the bus 40 and provides output to a display device 78, typically a CRT monitor, and receives inputs from a manual 80 device such as a keyboard. Manual input may also be provided from a pointing device such as a mouse.

A network adapter 82 is provided for coupling the system to a network.

The components illustrated in Fig. 1 may be embodied in a personal computer, a portable computer, a workstation, a minicomputer, a main frame computer, or a super computer. As such, the details of the physical aspect of the data processing system such as structure of the bus 40 or the number of CPUs 38 that are coupled to the bus 40, is not crucial to the operation of the invention and thus is not described in further detail below. Turning now to Fig. 2, a high level flow diagram is shown for carrying out the present invention in accordance with one specific aspect. Although the present invention is primarily discussed with respect to a Pain Management Clinic (PMC), it is to be appreciated that the present invention may be applied to any suitable medical system, and the claims are intended to include such breadth of scope.

In step 100, a patient is referred to the PMC as part of an intake procedure of the present invention. During this step, a patient evaluation is performed so that a determination of the appropriateness of various treatments can be determined. If appropriate, base-line outcome studies are completed as well in this step. Next, in step 102, patient demographics

(*e.g.*, sex, age, occupation, etc.) are obtained and ICD diagnosis is performed. The commonly used notation ICD-9-CM means the International Classification of Diseases - 9th Revision, Clinical Modification, and refers to a coding system based on and compatible with the original version of the ICD-9 coding system provided by the World Health Organization. The ICD-9-CM coding system is used in North America, and it is a classification of diseases, injuries, impairments, symptoms, medical procedures and causes of death. These codes are listed in detail in a publication of the Commission on Professional and Hospital Activities, Ann Arbor Michigan. It is likely that the classification system will be revised and new revisions forthcoming over the years. The techniques described herein are not limited to a particular version of the ICD diagnosis and procedure classification system but rather will employ whatever system is current at the time and suitable for carrying out the present invention. Furthermore, it is to be appreciated that any classification system suitable for carrying out the present invention may be used.

The present invention next proceeds to step 104 where the patient is treated to a predefined goal. The core team in a PMC is the physician, nurses and various rehabilitation specialists. In step 104, these core groups decide what they can contribute to the patient's treatment and/or decide if the patient is even appropriate for a particular treatment. Once the predefined goal (*e.g.*, treatment regimine) is determined, the process proceeds to step 106. In step 106, it is determined whether the predefined goal has been met. For example, if a certain goal such as the patient will be able to perform limited activities at home within 4 weeks is met, the goal has been reached, if not the predefined goal has not been met. In step 106, if the system determines the predefined goal has not been met the process is advanced to step 108.

In step 108, the invention reevaluates the diagnosis and treatment goals set for the patient and patient compliance with the predefined goals. In this step, a query is performed as to why the predefined goals were not met.

For instance, the core team reevaluates its goals and determines if the goals were too optimistic or inappropriate, or that one of the core teams was underperforming or the patient was not compliant with the rehabilitation program. The process is them returned to step 104 where new predefined goals are set. The loop between steps 104-108 is repeated until the predefined goals have been met, the patient has been discharged or the goals have been reduced to an appropriate level that can be achieved. Once the predefined goals have been met, the process moves to step 110 where the patient is transferred for follow-up and/or referral.

After step 110, the system 32 documents long-term follow up costs, exacerbations and periodic outcome evaluations. For example, if the patient needed a high tech implant or interventional treatment in order to be rehabilitated the long-term costs and results of the employment of the device is documented. Devices tend to break, need repairs, have various operating characteristics over time,. etc., and the documentation of these devices facilitates the determination of whether or not the devices are useful and cost/beneficial for their intended purpose.

The process then proceeds to step 114 where the patient demographics obtained in step 102 are correlated with the data from step 114 so that a comprehensive history of the patient is obtained which can be incorporated into a historical database. The compilation of such data facilitates determining which treatment programs are effective for a given illness, determining how long the treatment process will take, the likely outcome of the treatment given the demographics of the particular patient, and the short term and long-term costs associated with the treatment.

Referring now to Figs. 3a-3c, a flow diagram representing the application of the present invention to a core group (*i.e.*, Occupational Therapy) is shown. In step 150, the physician makes a referral to a therapist - in this case an occupational therapist. For example, the physician after performing a history and physical of the patient may make a determination that occupational therapy is needed. For instance, if the patient is an elderly

woman and she can't take care of her house because her neck and her shoulders are arthritic, the physician may make the determination that he can handle part of the pain, however, the patient has problems relating to muscular movement and thus some adapted devices may be needed to facilitate her functioning again. As a result, the physician makes a referral to the occupational therapist.

In step 152, rehabilitive problems concerning occupational therapy are determined and/or analyzed. In step 154, occupational therapy evaluation and assessment of the patient is performed. This includes setting goals and time frames within which to achieve the goal. Based on the evaluation and assessment, in step 156 the occupational therapist determines if indeed the patient is appropriate for being treated by occupational therapy. If no, the diagnosis and treatment plan is rethought in step 158. However, if in step 156 the occupational therapist deems the patient to be appropriate for treatment for occupational therapy the process proceeds to step 160 where the intensity of service required is determined. At step 160 there are three various services available, however, it will be appreciated that more than three can be employed to carry out the present invention.

The three various services are shown at steps 162, 164, 166, respectively. Step 162 represents four to six weeks of daily treatment according to a fixed schedule with goal oriented treatment plans and weekly team meetings as part of the therapy. Step 164 involves eight weeks of treatment at 2-3 sessions per week as required with goal oriented treatment plans and weekly team meetings as part of the therapy. Step 166 involves eight weeks of treatment 2-3 session per week as required with goal oriented treatment plans.

After either steps 162, 164, 166 are completed, the process proceeds to step 180 where four various determinations are made relating to decreased strength and/or endurance in step 182, or decreased AROM

trunk - upper extremities at 184 or decrease positive awareness and body mechanics at step 186 or pain spasms edima trunk upper extremities 188. These steps relate to multiple and single services in that the patient may have at least two concurrent treatments for example for two different special occupational therapies. For example, if it is determined that the patient has decreased strength and/or endurance from step 182, the process proceeds to steps 190, 192 and 194 where various occupational therapy programs are applied concurrently or singly. In step 190 the occupational therapist applies resistant exercises to the patient and educates the patient with respect to home exercise programs. In step 192, the patient undergoes aquatic exercises and is educated also with respect to a home exercise program. In step 194 the patient performs aerobic exercises and also is educated on a home exercise program.

Once any or all of steps 190 and 192 and 194 are completed, the process proceeds to step 196 where the present invention determines if progress has been made toward achieving the goals originally set. This review process can be performed every two weeks. If in step 196 its determined that the progress has not achieved the desired goals, the process proceeds to step 198 where the diagnosis and treatment plan is rethought. If in step 196 the progress towards the goal has been achieved the process advances to step 200 where the system assesses appropriate living/job related skills of the patient.

Turning back to step 184, if it is determined that the patient has decreased AROM trunk - upper extremities an occupational therapy regimen of stretching and modalties is performed at steps 210 and to 212. After the stretching and modalities steps are performed the process goes to step 214 where it is determined whether progress toward the desired goals has been achieved. Once again this progress evaluation can be an ongoing evaluation process that may be performed every two weeks for example. If in step 214 it is determined that progress toward the goals has not been achieved the present invention advances to step 198 where the diagnosis and treatment

plan is rethought. If it is determined that progress toward the goals has been achieved, the process advances to step 200 where an assessment is performed to determine appropriate living/job related skills of the patient.

Moving back to step 186, if it is determined that the patient has decreased positive awareness and/or body mechanics the process proceeds to step 220 where patient education retraining is performed. Then the invention advances to step 196 where the progress towards goals is determined and if adequate progress towards goals has not been achieved the process moves to step 198 where the diagnosis and treatment plan is rethought. However, if the progress towards goals has been achieved the invention again goes to step 200. Returning to step 188, if the patient is undergoing pain or having spasms or edema of the trunk and upper extremities an occupation therapy program of modalities and masso therapy is performed at steps 224 and 226 respectively. After the modalities and masso therapy is performed the process moves to step 196 where progress towards the goal is determined and once again if adequate progress has not been made the invention returns to step 198 where the diagnosis and treatment plan is rethought. If adequate progress has been made, the invention goes to step 200 where an assessment of appropriate living/job related skills with the patient is performed.

After step 200, the occupational therapist determines if an employment of the patient is appropriate in step 240. If it is determined that the patient may be employed once again, the process proceeds to step 242 and step 246 where a physical capacity evaluation is performed at step 242 and modified home/living skills education step is performed at step 246. If employment is deemed not appropriate, the process proceeds to step 246 alone where modified home/living skills education is performed. After step 242, the process proceeds to step 248 where it is determined if it is indeed realistic for the patient to return to his/her prior job. If no, the process moves to step 250 where the patient is referred to vocational rehabilitation for other employment options. If however, it is determined in step 248 that it is

realistic for the patient to return to his/her prior job, the invention proceeds to step 260.

Also, after step 246 the process proceeds to step 260 where job/living task modification reeducation of the patient is performed. In step 270, it is determined whether or not the preset goals have been achieved for the respective patient. If no, the process advances to step 272 where the diagnosis and treatment plan is rethought. If in step 270 it is determined that the goals have been achieved the process moves to step 280 where the occupational therapy treatment plan is documented and an appropriate follow up treatment is planned.

Referring now to Figs. 4a-4c, a flow diagram representing the application of the present invention to a physical therapy core functional group is shown. In step 300, the physician makes a referral to a therapist - in this case a physical therapist. For example, the physician after performing a history and physical of the patient may make a determination that physical therapy is needed. For instance, if the patient is an elderly man and he can't move around in his house because his hip was injured, the physician may make the determination that he can handle part of the pain, however, the patient has problems relating to muscular movement and thus some adapted devices may be needed to facilitate his functioning again. As a result, the physician makes a referral to the physical therapist.

In steps 302 and 304, physical therapy evaluation and assessment of the patient is performed. This includes setting goals and time frames within which to achieve the goal. Based on the evaluation and assessment, in step 306 the physical therapist determines if indeed the patient is appropriate for being treated by physical therapy. If no, the diagnosis and treatment plan is rethought in step 308. However, if in step 306 the physical therapist deems the patient to be appropriate for treatment for physical therapy the process proceeds to step 310 where the intensity of service required is determined. At step 310 there are three various services available, however, it will be

appreciated that more than three can be employed to carry out the present invention.

The three various services are shown at steps 312, 314 and 316 respectively. Step 312 represents four to six weeks of daily treatment according to a fixed schedule with goal oriented treatment plans and weekly team meetings as part of the therapy. Step 314 involves eight weeks of treatment at 2-3 sessions per week as required with goal oriented treatment plans and weekly team meetings as part of the therapy. Step 316 involves eight weeks of treatment 2-3 session per week as required with goal oriented treatment plans.

After either steps 312, 314 and 316 are completed, the process proceeds to step 320 where four various determinations are made relating to decreased strength and/or endurance in step 322, or decreased AROM trunk - upper extremities at 324 or decrease positive awareness and body mechanics at step 326 or pain spasms edima trunk upper extremities 328 These steps relate to multiple and single services in that the patient may have at least two concurrent treatments for example for two different special occupational therapies. For example, if it is determined that the patient has decreased strength and/or endurance from step 322, the process proceeds to steps 330, 332, 334 where various physical therapy programs are applied concurrently or singly. In step 330 the occupational therapist applies resistant exercises to the patient and educates the patient with respect to home exercise programs. In step 332, the patient undergoes aquatic exercises and is educated also with respect to a home exercise program. In step 334 the patient performs aerobic exercises and also is educated on a home exercise program.

Once any or all of steps 330 and 332 and 334 are completed the process proceeds to step 336 where the present invention determines if progress has been made toward achieving the goals originally set. This review process can be performed every two weeks. If in step 336 it is determined that the progress has not achieved the desired goals, the process

proceeds to step 338 where the diagnosis and treatment plan is rethought. If in step 336 the progress towards the goal has been achieved the process advances to step 340 where the system assesses appropriate living/job related skills of the patient.

Turning back to step 324, if it is determined that the patient has decreased AROM trunk - upper extremities an occupational therapy regimen of stretching and modalities is performed at steps 342 and to 344. After the stretching and modalities steps are performed the process goes to step 336 where it is determined whether progress toward the desired goals has been achieved. Once again this progress evaluation can be an ongoing evaluation process that may be performed every two weeks for example. If in step 336 it is determined that progress toward the goals has not been achieved the present invention advances to step 338 where the diagnosis and treatment plan is rethought. If it is determined that progress toward the goals has been achieved, the process advances to step 340 where an assessment is performed to determine appropriate living/job related skills of the patient.

Moving back to step 326, if it is determined that the patient has decreased positive awareness and/or body mechanics the process proceeds to step 348 where patient education retraining is performed. Then the invention advances to step 336 where the progress towards goals is determined and if adequate progress towards goals has not been achieved the process moves to step 338 where the diagnosis and treatment plan is rethought. However, if the progress towards goals has been achieved the invention again goes to step 340.

Returning to step 328, if the patient is undergoing pain or having spasms or edema of the trunk and upper extremities an occupation therapy program of modalities and massotherapy is performed at steps 352 and 356 respectively. After the modalities and massotherapy is performed the process moves to step 336 where progress towards the goal is determined and once again if adequate progress has not been made the invention returns to step 338 where the diagnosis and treatment plan is rethought. If

adequate progress has been made, the invention goes to step 340 where an assessment of appropriate living/job related skills with the patient is performed.

After step 340, the occupational therapist determines if an employment of the patient is appropriate in step 360. If it is determined that the patient may be employed once again, the process proceeds to step 362 and step 364 where a physical capacity evaluation is performed at step 362 and modified home/living skills education step is performed at step 364. If employment is deemed not appropriate, the process proceeds to step 364 alone where modified home/living skills education is performed. After step 362, the process proceeds to step 368 where it is determined if it is indeed realistic for the patient to return to his/her prior job. If no, the process moves to step 370 where the patient is referred to vocational rehabilitation for other employment options. If however, it is determined in step 368 that it is realistic for the patient to return to his/her prior job, the invention proceeds to step 372.

Also, after step 364 the process proceeds to step 372 where job/living task modification reeducation of the patient is performed. In step 374, it is determined whether or not the preset goals have been achieved for the respective patient. If no, the process advances to step 376 where the diagnosis and treatment plan is rethought. If in step 374 it is determined that the goals have been achieved the process moves to step 378 where the physical therapy treatment plan is documented and an appropriate follow up treatment is planned.

Turning now to Figs. 5a-5c the core function relating to nursing is discussed at step 400. An intake interview and patient assessment is performed with respect to nursing problems and rehabilitation problems. In step 404, the medical diagnosis is reviewed and a treatment plan is developed to address nursing problems. In step 408 the invention determines whether or not a procedure is required. If no, the process proceeds to step 410 where the rehabilitative service intensity required is determined. If

concurrent pain management program (CPMP) is needed, the process moves to step 412 where four to six weeks of daily treatment according to a fixed schedule with goal oriented treatment plans and weekly team meetings is performed as part of the therapy. Thereafter, the process proceeds to step 420 for various nursing care involving medication compliance reinforcing treatment gains, application of functional gains to home life, teaching methods of non-pharmalogical pain and stress management techniques are performed on the patient. The process then proceeds to step 430 where a determination is made as to if rehabilitation goals have been met. If no, the process advances to step 432 where the diagnosis and retreatment plan are reviewed.

Turning back up to step 410 briefly, if it is determined that multiple services are needed the process proceeds to step 422 where eight weeks of treatment at two to three sessions per week as required with goal oriented treatment plans and weekly team meetings as part of the therapy is performed. Then the process moves to step 420 where nursing care involving medication compliance, reinforcing treatment gains, and functional gains through home life, teaching methods of non-pharmalogical pain, and stress management techniques are performed. If in step 410 single services are deemed appropriate, the process moves to step 426 where eight weeks of treatment at two to three sessions per week as required with goal oriented treatment plans is performed. Then this process goes to step 420 where nursing care involving medication compliance, reinforcing treatment gains, application of functional gains of home life, teaching methods of non-pharmacologic pain, and stress management techniques is performed.

After steps 420, the invention goes to step 430 where it is determined whether the rehabilitation goals have been met. If no, the process proceeds to step 432 where the diagnosis and treatment plan is once again reviewed. If in step 430, the rehabilitation goals have been met, the process then advances to step 490 which will be discussed in greater detail below.

Returning back to steps 408 and 410 if a nursing procedure is required or no rehabilitative service intensity is needed. The process proceeds to step 450 where the patient is placed in follow-up service. In step 450, a review is done to determine if goals have been achieved and whether the patient's needs as to new skills are transferred to the patient's life. In step 452, a documentation process is performed with respect to integration issues and problems with adaption of the patient. If the patient has continued medication needs, the process advances to step 454 where continued monitoring of medication compliance is performed to assure appropriate follow-up schedules for medications prescribed to the patient. Furthermore, a determination is made as to continued medication effectiveness, and coordination of care is done with a physician. Thereafter the process moves to step 456 where the invention determines if the medications have an effect and were used appropriately. If yes, the process goes to step 458 where continued follow-up of the patient is performed as required. If no, the process returns to step 452.

If in step 452 it is determined that further procedures are required, the process goes to step 460 where continued monitoring of appropriate activity is performed to assure follow-up office visits and to ensure treatment of potential side effects and maintenance of functions. Then the process proceeds to step 462 where it is determined if the procedure was effective and function maintained. If yes, the process moves to step 464 where a continued follow-up as required is performed. If no, the invention once again returns to step 452.

If in step 452 an implanted device is required by the patient, the process proceeds to step 470 where a continued monitoring of the device and its function is performed to assure appropriate follow-up schedules for the device implanted, and a determination as to the continued effectiveness and appropriate use of the device by the patient is made. This process is coordinated with treatment by the physician as well. In step 472, it is determined whether the implant is effective and is being used appropriately.

If yes, the process advances to step 474 where the continued follow-up as required is performed. If no, the process once again returns to step 452.

Returning back to step 430, if the rehabilitation goals have been met the process proceeds to step 490. In step 490 the treatment plans and results of previous treatment are reviewed. In step 492, a determination is made as to the treatments ordered. If medications were ordered in step 494 a review of the medications ordered and the medications patient is already taking is made. Additionally, a determination is made of the treatment schedule and compliance, and a discussion is ensued as to the appropriate treatment regimen for the patient. Renewal of prescriptions as appropriate are made and a discussion is also conducted as to management of possible side effects resulting from the medication.

If in step 492 a determination is made that a nursing procedure should be performed, the process advances to step 496. In step 496 the patient is taught about the type of procedure ordered, the potential side effects and management thereof. The physician follows-up the patient, and to ensure that the follow-up procedure is performed appropriate communication is maintained with the patient. Additionally, the patient is encouraged to participation in his treatment.

If in step 492 a determination is made that an implantable device has been ordered for the patient, the process goes to step 498. In step 498 the patient is educated on the type of device ordered, the potential side effects and the management thereof. Furthermore, the effectiveness of the device and the relief it provides is assessed after implantation. The physician follows-up the patient, and to ensure that the follow-up procedure is performed appropriate communication is maintained with the patient. Additionally, the patient is encouraged to participation in his treatment.

After any or all of steps 494-498 are completed, the process proceeds to step 500 where it is determined if the treatment was effective. If no, the process returns to step 490. If yes, the process moves to step 502 where

the invention determines whether further rehabilitation is required. If no, the process proceeds to step 450. If yes, the process proceeds to step 410.

Turning now Figs. 6a-6c, a flow chart is shown depicting the core function of vocational services. In step 510 a referral procedure is employed where employment barriers and disability conditions are cataloged. Thereafter, the process proceeds to step 512 where the catalog information is reviewed and the patient is interviewed to determined eligibility for vocational services. If in step 512 it is determined that the patient is not eligible for vocational services the process proceeds to step 514 where the patient is referred to other resources. If however, the patient is eligible, the process moves to step 520 where a vocational evaluation is performed to assess the rehabilitation potential of the patient. Then in step 522, a report is generated relating to the rehabilitation potential of the patient and is presented at a team meeting of the various members of the core groups along with recommendations as to how to proceed with rehabilitating the patient.

In step 524, a determination by the staff is made as to whether or not to recommend vocational services for the patient. If the staff determines that vocational services are not recommended, the process proceeds to step 514 where the patient is referred to other resources. If the staff determines that the patient needs CPMP, the process proceeds to step 530 where a CPMP evaluation is performed. Then in step 532, a report summarizing the evaluation is generated. The process then advances to step 534 where the vocational potential of the patient is determined. If it is deemed that the patient does not have vocational potential the process returns to step 514 where the patient is referred to other resources. However, if the patient is deemed to have vocational potential, CPMP is performed at step 536. Steps 538 and 550 can be performed concurrently or separately. Step 550 relates to case management. In step 538 relates to vocational counseling. Step 538 vocational counseling of the patient is performed and thereafter the patient is referred to either individual counseling at step 540 or group

counseling in step 542 whichever is more appropriate. Referring back to step 550, case management is performed and then in step 560 the progress of the case management is assessed. If no or little progress has been made, the process advances to step 564 where goals are redefined and the program is changed according to the needs of the patient. Then the process moves on to step 562 where CPMP is continued. If however, in step 560 it is determined that progress has been made the process advances directly to step 562 where CPMP is continued. After step 562, the process goes onto step 566 where its once again determined whether progress has been made or not. If no or little progress has been made the system advances to step 568 where the diagnosis and treatment plan are reviewed. If, however, progress has been made, the system advances to step 570 where vocational services and rehabilitation services are recommended. In step 572 vocational evaluation and assessment of the back to work potential of the patient is made.

Returning back to step 524 where the staffing determines whether vocational services are recommended or not, if the vocational services are recommended the process moves to step 580 where a vocational rehabilitation situation assessment is performed. In step 528 progress notes and final reports are generated as to the vocational rehabilitation situation. If in step 584 it is determined that the patient has not improved, the process returns to step 514 where the patient is referred to other resources. However, if it is determined that the patient has improved in step 584 the process moves on to step 586.

In step 586, work adjustment and vocational counseling is performed. Then in step 588, recommendations as to treating the patient further are made. Then once again the vocational potential of the patient is assessed at step 590. If no vocational potential is present the patient is referred for appropriate services at step 600.

If however vocational potential is found in step 590 then the process proceeds to steps 608 and 602 which can be performed concurrently or

individually. Turning briefly to step 602 alone, the training potential of the patient is determined by the facility on site. In step 604 it is determined whether or not the facility is appropriate for training the patient. If not, the process returns back to step 602 where an appropriate facility is once again determined. If however in step 604 it is determined that the facility is appropriate the process proceeds to step 606 where a staffing report is generated.

Returning back to step 608 the employment potential of the patient is determined and goals are set. Then the process advances to step 610 where targeted jobs are determined appropriate or not appropriate. If the targeted jobs are not appropriate the process returns back to step 608 where the determination for employment goals is once again made. However, if the targeted jobs are appropriate, the process moves on to step 612 where a staffing report is generated then in step 604 a job search is performed. In step 620, a determination is made as to whether or not job modification is needed. If no, a staffing report is generated at step 622 and follow-up as required are performed. If instead at step 620 it is determined that job modification is needed, the process moves to step 624 where job modification is performed. Then in step 626 it is determined whether or not the patient can return to work. If it is determined at step 626 that the patient cannot return to work the process returns to step 590 where the vocational potential of the patient is once again assessed. However, if the patient is able to return to work, the process proceeds to step 628 where a staffing report is generated and any follow-up that may be required is performed. Then once again the vocational potential of the patient is assessed at step 590. If no vocational potential is present the patient is referred for appropriate services at step 600.

If however vocational potential is found in step 590 then the process proceeds to steps 608 and 602 which can be performed concurrently or individually. Turning briefly to step 602 alone, the training potential of the patient is determined by the facility on site. In step 604 it is determined

whether or not the facility is appropriate for training the patient. If not, the process returns back to step 602 where an appropriate facility is once again determined. If however in step 604 it is determined that the facility is appropriate the process proceeds to step 606 where a staffing report is generated.

Turning now to Figs. 7a-7c, a flow chart relating to the non-clinical support function is described. In step 700 a patient or referral source calls for an appointment. In step 702, a non-clinical support staff determines whether the matter is urgent or the call is from a referral source. If no, the process proceeds to step 704 and it is determined whether the patient has been seen or not before the pain management clinic. If it is determined that the patient is an established patient the process moves to step 706 where a review is done for the eligibility for an office visit by the patient and an appointment is made with the PMC physician. The process then moves on to step 708 where the patient is registered and deductibles and co-pays are collected.

Next the process proceeds to step 710 where the patient is seen by a physician and orders are written up. Returning back to step 704 if it is determined that the patient is a new patient, the process moves to step 720 where an appointment is made with the requested pain management physician or the patient did not have any preference. The first available pain management center physician is designated. Then, the process proceeds to step 724 where the patient is called back to obtain insurance information and is explained as to what will happen at the appointment and an information packet is sent to the patient. Additionally, the patient is reminded to bring old records and any x-rays as appropriate and lab reports.

Then the process goes to step 726 where the patient is called the day before the appointment to remind him/her to bring nec ssary information and records to the appointment. In step 728 it is determined whether the patient has gets the appointment or not. If not, the process returns to step 720 where another appointment is made. This rescheduling process is only

conducted two additional times with the same doctor, and if the patient fails to keep any of those appointments, no further appointments are made with the patient. If the patient does keep the appointment in step 728, the process advances to step 730 where an additional clerical interview is conducted, the patient signs forms as needed, any co-pays and deductibles required are collected from the patient. Then, in step 732 an initial nursing assessment is made, and nursing related problems are identified and listed. Then the process proceeds to step 710 where the patient seen by the physician and any related orders are written.

Returning back to step 702, if the non-clinical support staff determines that the patient entering the clinic has an urgent matter or was referred from a referral source, the process goes to step 740 where if the nature of the situation is urgent. The non-clinical support staff determines the nature of the urgency with the pain management center physician. In step 742 it is determined whether the patient must be seen immediately or not. If yes, the process proceeds to step 746 where the patient is scheduled with the pain management center physician and brought in as soon as possible. Then the process proceeds to step 708 where the patient is registered and any deductibles and co-pays owed are collected. If in step 742 it is determined that the patient does not have to be seen immediately the process goes to step 722 where an appointment is scheduled within five days with the first available pain management center physician. Then the process goes to step 724 where the patient is called back and any insurance information is obtained. The patient is explained the appointment and a patient is sent an information packet and reminded to bring old records and x-rays as appropriate.

Returning back to step 710, where the patient is seen by the physician and any related orders are written, thereafter the process moves to step 750. In step 750 the patient is returned to the front desk and the clerical staff checks for any related orders in step 752 the orders relating to the patient are determined. If it is determined that no further treatment is required the

process advances to step 754 where the patient is discharged and/or sent back to the referring physician and the patient is instructed to call if any further treatment is required.

If in step 752, it is determined that further procedures, rehabilitation, physocological services were ordered the process goes to step 756. In step 756, the non-clerical staff person sends for pre-certification, and if multiple services are required, refers the case to case management. In step 758, the insurance company is contacted and it is determined if any letters of medical necessity or other forms are required. Then in step 760 it is determined whether the insurance company approves of the orders. If it is determined that the insurance company has approved the orders, the process proceeds to step 762 where the procedure or study is scheduled. If however, the approval is denied in step 760 by the insurance carrier, the process goes to step 764. In step 764 the denial of the insurance coverage is discussed with the physician and it is determined whether an appeal should be made or whether to search for new sources of funding. In step 766 it is determined if the denial is to be appealed. If the denial is not to be appealed, the process proceeds to step 768 where the patient is seen and alternative options are discussed. If, however, the denial is to be appealed, the process proceeds to step 770 where the patient is seen on regular intervals and is managed as able while the appeal is pending. Thereafter the process returns to step 758 where the insurance company is contacted and any letters of medical necessity or forms that may be required are supplied to the insurance company.

Turning back to step 752, if radiographic laboratory studies are needed, the process goes to step 780. In step 780 a determination of the insurance reimbursement requirements are made. In step 782, it is determined whether the patient is able to have studies immediately perform d. If yes, the process proceeds to step 784 where the patient is registered and the studies are performed. If however, the studies are not able to be immediately performed the process proceeds to step 756. In step

756 as discussed above the non-clinical support person sends for pre-certification and if multiple services are required the patient is referred to case management.

Fig. 8 represents a high level flow chart representative of treating a patient employing a disease specific outcome measured approach in accordance with one specific aspect of the invention. In step 800, a patient enters the PMC for treatment. In step 802, data is collected from the patient with respect to his/her particular demographics and the illness, pain and/or disease the patient is suffering from. The process then proceeds to step 804 where it is determined whether or not the patient's disease falls within a particular class (*e.g.*, ICD). If no, the physician handles the case with respect to the unique ailment of the patient under conventional techniques. If, however, the disease is classifiable the process advances to step 810 where the appropriate class is applied. Next, in step 812 the recommended steps for treating the patient with respect to the classified disease are determined. The process continues on to step 814 where it is determined what treatment steps have already been performed on the patient and what treatment steps still need to be performed.

Then, in step 820 an outcome measured approach is applied where historical data relating to the illness is applied toward treating the patient. It is determined from the recommended treatment steps correlated against historical data relating to the illness and demographics of the patient which steps are likely to produce the best outcome for the patient on a cost/benefit basis. As a result, the physician, hospital, insurance carrier and other interested parties can determine with a substantial degree of certainty the likely outcome for the patient being treated for the illness, the length of treatment, the associated costs, etc.

In step 822 the patient is monitored with respect to his/her treatment and related data is documented. The data may be added to the historical data. In step 830, a follow-up of the patient is performed to assess the

effectiveness of the treatments and to determine whether or not modifications and/or additional treatments are necessary.

Briefly turning to Figs. 9a - 9c, an example of the invention is illustrated in sections of a flow diagram represented at 850. The flow diagram includes those sections shown in all three drawing figures. The flow diagram 850 relates to the medical condition of spasticity and the flow diagram may be used to carry out the method of the invention using the apparatus of the invention or other apparatus to input information concerning the medical condition of a patient and to correlate that information with disease or pain information, treatment information, and/or cost information; correlation also may be with respect to historical data of the patient and/or of a plurality of patients. The steps depicted in the flow diagram are relatively self-explanatory and would be understood by a person who has ordinary skill in the art. Appropriate computer program software may be written to carry out the various procedures and steps illustrated not only in the flow diagram of Figs. 9a - 9c but also those in the various other drawing figures of this patent application.

At step 851 (sometimes the steps are referred to herein as blocks, e.g., "block 851") a diagnostic work-up for spasticity is obtained for a given patient using conventional medical technique. At block 852 the source of spasticity is determined, for example, spinal spasticity (block 853) or cerebral spasticity (block 854). Following the flow diagram 850 to Fig. 9b based on a determination that the source of spasticity is spinal spasticity (block 853), the flow diagram continues to block 854 where pathological changes leading to spasticity with the spinal cord is the primary source of the spasticity.

At block 855 an inquiry is made whether the signs and symptoms of spinal spasticity exist. If not, then at block 856 the diagnosis and treatment plan for the patient are re-evaluated. However, if there are signs and symptoms of spinal spasticity at block 855, then at block 860 a multidisciplinary functional evaluation of the patient is made.

If spasticity is functionally significant (block 861), then rehabilitative therapies directed towards control of spasticity and functional improvement are carried out at block 862. At block 863 an inquiry is made whether functional improvement has been made. If affirmative, then rehabilitative therapies and patient follow-up are carried out at block 864. However, if functional improvement is not made at block 863, then at block 865 consideration is given to trying certain medications. If the medications are effective and able to be tolerated at block 866, then they are continued at block 864, but if they are not, then at block 867 the spasticity is evaluated again.

If the evaluation at block 867 indicates multifunctional units, then at block 870 intrathecal baclofen trials are made. If at block 871 those trials are effective, then at block 872 a DAS is implanted in the patient for intrathecal baclofen; at block 873 postoperative care and therapy optimization are provided and at block 874 rehabilitation therapies and follow-up are provided. If the intrathecal baclofen trial(s) is not effective, then at block 875 the diagnosis and treatment plan are reconsidered.

Moving back to block 867, if the spastcitiy is single functional unit, then at block 876 motor point block trials are carried out followed by botulinum toxin injections. If these are effective at block 877, then the flow diagram moves back to point "A" to continue with rehabilitative therapies and follow-up at block 864. If not effective at block 877, then the patient may be referred for surgical consultation at block 878.

If at block 854 in Fig. 9a it is determined that the source of spasticity is cerebral at block 854, then, referring to Fig. 9c, at block 890a, 890b the signs and symptoms of cerebral spasticity are checked. If they do not exist, then at block 891 the diagnosis and treatment plan is reevaluated. If the signs and symptoms of cerebral spasticity do exist, then at block 892 a multidisciplinary functional evaluation of the patient is made.

Blocks 861' through 878' correspond generally to the blocks and steps 861 through 878 of Fig. 9b.

Turning, now, to Figs. 10a and 10b, a disease state management and pain management aspect and method of the invention is presented as an example which addresses a patient who has pain due to auto-immune deficiency syndrome, as is shown in a flow diagram 900. As is represented at block 901, the pain or discomfort may be either localized to one organ system or may involve multiple organ systems associated with one or more opportunistic infections. The pain or discomfort can be associated with the drugs used in the treatment of AID's and/or caused by the opportunistic infections themselves.

At block 902 and inquiry is made whether signs and symptoms of HIV infection exists. If not, then at block 903 the diagnosis and treatment plan are reevaluated. However, if affirmative, then at block 904 an infections disease work-up is considered. If an infections disease work-up is required, then at block 905 an inquiry is made whether signs and symptoms of organ system failure or compromise exist. If not, then the character, diagnosis, and responsiveness of pain to previous treatment if any is considered (block 906) and the etiology of the pain is considered (block 907). If the pain is a non-HIV pain, then at block 908 appropriate diagnosis and treatment is carried out for the particular pain. However, if the pain is an HIV related pain, then at block 910 an analgesic ladder is initiated. At block 911 the severity of the pain is checked or determined, and the appropriate drug treatment, for example, opiate,
non-opiate, adjuvant, etc., is carried out, depending on whether the pain is mild, moderate or severe (blocks generally indicated at 912).

At block 913 an inquiry is made whether the treatment is effective. If affirmative, then at block 914 the treatment plan is continued. If the treatment is not effective and function is not restored as determined at block 913, then at block 915 consideration is given to therapeutic trial of nerve blocks, psychosocial interventions, and/or rehabilitative therapies. At block 916 an inquiry is made whether the treatment was effective and function was restored. If affirmative, then following to point (B), the treatment plan is

continued at block 914. If the treatment is not effective and function is not restored, then the flow diagram continues to Fig. 10b where further steps, considerations, treatments, corelations, etc. are carried out.

At block 920 in Fig. 10b the treatment plan is reconsidered and therapy may be modified. At block 921 a determination is made as the cause for the continued pain. Five possibilities of causes are identified as examples at blocks 922-926, namely unacceptable side effects from medications, musculo-skeletal pain, mucositis, movement related pain, functional disability, and neuropathic pain.

After correlating the patient information with disease/pain information and treatment considerations, depending on the cause of the pain identified at blocks 922 - 926, various steps or plans for treatment or other consideration are illustrated at blocks 932 - 936, respectively. These include at block 932 use of different medications, changing the route of administration, and managing side effects with adjuvant and cognitive therapy. At block 933, optimize the NSAID's and OPIATES, consider a possible neurolytic block if there is a sclerotome pain pattern, and consider alternative medicine, such as acupuncture. At block 934 consider oral mouth washes, local anesthetic rinses, transdermal or subcutaneous opiates, other medications or other antibiotics. At block 935, consider surgical or physical stablization, nerve blocks, neuroablative procedures, and other rehabilitative therapies. At block 936, consider other adjuvant drugs, spinal opiates with local anesthetics, and neurolytic procedures after appropriate trials.

At block 940 the life expectancy for patients requiring implantable therapies is considered. If for the given patient the life expectancy is greater than four (4) months, then at block 941 a totally implantable system is considered to provide the treatment called for in blocks or steps 932 - 936. If the life expectancy of the patient is less than four (4) months, then reconsider implantable systems.

Referring to block 943, an inquiry is made whether the treatment was effective and the expected function was restored. If affirmative, then the

treatment plan is continued at block 944. If not, then the etiology of continued pain is reevaluated at block 945 proceeding either to block 920 if the pain is HIV-related or continuing at block 946 to appropriate diagnosis and treatment plan if the pain is non-HIV pain.

Turning back briefly to Fig. 10a, at block 904 if the infections disease work-up is not required, then at block 960 the patient is referred to specialty care and the treatment plan already carried out for the patient is continued. Also, briefly referring to block 905, if the signs and symptoms of organ system failure or compromise are found, then the patient is referred to appropriate specialty care at block 961.

The foregoing description regarding Figs. 9 and 10 are exemplary of processes carried out using the principles of the present invention. It will be appreciated that other pain or disease conditions can be evaluated, diagnosed, considered for treatment, correlated with patient medical information, and so forth using principles of the present invention.

The present invention provides for a methodology which includes determining the type of disease or chronic pain the patient is suffering from. The invention further determines what treatments the patient has already undergone in treating the disease and/or chronic pain. Based on the above determinations, the present invention formulates a treatment plan for the disease and/or chronic pain and forecasts the likely outcome of the treatment plan, the length of the treatment and the associated costs.

By employing historical data relating to the determined disease, chronic pain, payor and facility a streamlined treatment plan can be instituted which avoids unproductive treatments steps, saves money and expedites curing the patient. As a result of the present invention, treatment of diseases and/or chronic pain is significantly facilitated. Furthermore, the present invention affords for doctors, hospitals and insurance companies to determine with substantially greater precision the cost and length of a particular treatment plan. In particular, the present invention provides for a means to filter out among a plurality of treatment plans the optimal treatment plan for a patient.

This filtering aspect along with providing for good prediction of the likely outcome of the treatment and the costs associated therewith affords for increased efficiencies with respect to doctor time, hospital resources and insurance company actuarial analyses among other things.

The present invention further provides for forecasts as to the various risks associated with a given treatment plan. By providing a doctor, hospital and insurance carrier with reasonable predictions as to the results, costs and risks of treatment plans, these entities can collaboratively institute a treatment regimen which results in a cost effective, results oriented plan with optimal cost/benefit results for a patient.

Moreover, the present invention is applied to various sub-systems (*e.g.*, nursing, non-clinical support, physical therapy, etc.) of a treatment system in order to optimize the various sub-systems (*i.e.*, core functional groups) so that synergies are created when the various sub-systems are combined for treating the patient. In other words, by improving the overall efficiencies of the various sub-systems, the efficiency of the total system is improved.

As a result of the present invention, a patient is provided with an improved treatment plan which may lead to a quicker recovery as compared to convention treatment plans, and the efficiencies resulting from the subject invention may ultimately result in reduced medical costs to the patient.

It should be appreciated that the concept of the present invention can be extended further. In this regard, the present invention may be suitably modified to specify a web site location (URL) on the Internet, where the most up-to-date data and analyses tools are posted.

The present invention may be suitably coded in JAVA or other cross-platform procedural programming language (*e.g.*, "C"). Java is an object-oriented, distributed secure, architecture neutral language. Java provides for object-oriented design which facilitates the clean definition of interfaces and makes it possible to provide reusable "software ICs." Java has an extensive library of routines for copying easily with TCP/IP protocols like HTTP and

FTP. Java applications can open and access objects across a network *via* URLs with the same ease to which programmers are accustomed to accessing a local file system.

Furthermore, Java has a pointer model that eliminates the possibility of overwriting memory and corrupting data. Instead of pointer arithmetic that is employed in many conventional systems, Java has true arrays. This affords for subscript checking to be performed. In addition, it is not possible to turn an arbitrary integer into a pointer by casting.

Java affords for the support of applications on networks. Networks are composed of a variety of systems with a variety of CPU and operating system architectures. To enable a Java application to execute anywhere on the network, a compiler generates an architecture neutral object file format -- the compiled code is executable on many processors, given the presence of the Java runtime system. Thus, Java is useful not only for networks but also for single system software distribution. In the present personal computer market, application writers have to produce versions of their applications that are compatible with the IBM PC and with the Apple Macintosh. However, with Java, the same version of the application runs on all platforms. The Java compiler accomplishes this by generating bytecode instructions which have nothing to do with a particular computer architecture. Rather, they are designed to be both easy to interpret on any machine and easily translated into native machine code on the fly.

Being architecture neutral, the "implementation dependent" aspects of the system are reduced or eliminated. The Java interpreter can execute Java bytecodes directly on any machine to which the interpreter has been ported. Since linking is a more incremental and lightweight process, the development process can be much more rapid and exploratory. As part of the bytecode stream, more compile-time information is carried over and available at runtime.

The present invention through the use of Java affords for multiplatforming. That is the present invention can be implimented on

substantially all computers - the same applet (a program designed to be delivered through a browser) can work on a Macintosh, a Windows 95 machine, a Sun workstation, etc. To effect such multiplatforming, a network connection and a network browser (not shown) such as Netscape Navigator or Microsoft Internet Explorer may be used in at least one embodiment of the present invention. Although the present invention is described with respect to employing Java, it will be appreciated that any suitable programming language may be employed to carry out the present invention. Thus, the present invention may be both processor and operating system independent.

What has been described above are preferred embodiments of the present invention. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the present invention, but one of ordinary skill in the art will recognize that many further combinations and permutations of the present invention are possible. Accordingly, the present invention is intended to embrace all such alterations, modifications and variations that fall within the spirit and scope of the appended claims.

Industrial Applicability

The present invention has applicability in the field of computer systems.

Claims

1. A method for treating a patient, including the steps of:

assessing the patient's state;

planning appropriate treatment for the patient based on the patient's state; and

defining the costs of long-term treatment of the patient *via* an outcome oriented approach using historical data relating to the state of the patient.

2. The method of claim 1, further including the step of following the treatment of the patient on a long-term basis and determining the costs associated with follow-up care of the patient.

3. The method of claim 2 further including the step of prognosing a natural history of a disease of the patient.

4. The method of claim 1, further including the step of defining the long-term costs at inception of the treatment.

5. The method of claim 1, wherein the historical data includes data relating to a population of patients.

6. The method of claim 1, wherein the historical data includes data relating to the patient being treated.

7. The method of claim 1, wherein the patient's state is the physical state of the patient.

8. The method of claim 1, wherein the patient's state is the psychological state of the patient.

9. The method of claim 1, wherein the step of assessing the patient's state is disease specific.

10. A system for treating a patient, comprising:

a computer, the computer including:

a processor for processing functions relating to the treatment of the patient;

a memory operatively coupled to the processor, the memory adapted to store historical data relating to treatment of the patient;

wherein the computer is used to plan appropriate treatment for the patient based on the patient's state; and

define costs of long-term treatment of the patient *via* an outcome oriented approach using the historical data.

11. The system of claim 10, wherein the system is coupled to a network adapted for transmitting information relating to the treatment of the patient and costs for treating the patient to a third party system.

12. The system of claim 11, wherein at least one remote computer is operatively connected to the network, the at least one remote computer accessing the processor in order to perform the functions related to treating the patient.

13. The system of claim 11, wherein the third party system is part of an insurance carrier's system.

14. The system of claim 11, wherein the third party system us part of a hospital's system.

15. The system of claim 10, wherein data relating to the treatment of the patient is added to the historical data stored in the memory.

16. The system of claim 10, wherein the system is used to follow treatment of the patient on a long-term basis and determine costs associated with follow-up care of the patient.

17. The system of claim 10, wherein the system is employed to facilitate defining long-term costs of the treatment at inception of the treatment.

18. A method for treating a patient, including the steps of:

assessing the patient's state;

planning appropriate treatment for the patient based on the patient's state;

defining the costs of long-term treatment of the patient *via* an outcome oriented approach using historical data relating to the state of the patient, wherein the long-term costs are defined at inception of the treatment;

following the treatment of the patient on a long-term basis and determining the costs associated with follow-up care of the patient;

prognosing a natural history of a disease of the patient; and

defining the long-term costs at inception of the treatment.

19. The method of claim 18, wherein the step of assessing the patient's state is disease specific.

20. A system for treating a patient, comprising:

a computer including a processor for processing functions relating to the treatment of the patient, wherein the functions include:

planning appropriate treatment for the patient based on the patient's state;

defining the costs of long-term treatment of the patient *via* an outcome oriented approach using historical data relating to the state of the

patient, wherein the long-term costs are defined at inception of the treatment;

following the treatment of the patient on a long-term basis and determining the costs associated with follow-up care of the patient;

prognosing a natural history of a disease of the patient; and

defining the long-term costs at inception of the treatment.

21. A system for pain management, comprising

a memory for storing information concerning disease and/or pain,

an input for supplying medical information concerning a patient, and

a processor for processing functions relating to the medical information concerning the patient and information stored in the memory concerning disease and/or pain.

22. The system of claim 21, wherein said processor correlates medical information concerning the patient and information concerning disease and/or pain to produce treatment information and/or to define costs.

23. The system of claim 21, wherein the information concerning disease and/or pain concerns relates to spasticity.

24. The system of claim 23, wherein the processor correlates medical information concerning the patient and information concerning disease and/or pain relating to spasticity to provide a plan for treatment depending on whether the source of spasticity is spinal or cerebral.

25. The system of claim 24, wherein the processor correlates information to provide a plan for treatment relative rehabilitative therapies, medications, motor block, intrathecal baclofen treatment, and surgical consultation.

26. The system of claim 21, wherein the information concerning disease and/or pain concerns relates to pain of auto-immune deficiency syndrome.

27. The system of claim 26, wherein the processor includes means for correlating patient medical information with regard to severity of pain and provides information for initiating an analgesic ladder, including planning treatment based on level of pain, e.g., whether pain is mild, moderate or severe.

28. The system of claim 26, wherein the processor includes means for correlating patient medical information with regard to the cause of pain and information concerning disease and/or pain for planning treatment using one or more of medications, druges, neurolytic block, mouth washes, antibiotics, local anesthetics, or the like.

29. The system of claim 21, said processor providing processing functions relating to the treatment of the patient, the memory is operatively coupled to the processor and is adapted to store historical data relating to treatment of the patient, and the processor is used to plan appropriate treatment for the patient based on the patient's state and/or to define costs of long-term treatment of the patient *via* an outcome oriented approach using the historical data.

30. The system of claim 21, said processor being operative for processing functions relating to the treatment of the patient, wherein the functions include:

planning appropriate treatment for the patient based on the patient's state;

defining the costs of long-term treatment of the patient *via* an outcome oriented approach using historical data relating to the state of the

patient, wherein the long-term costs are defined at inception of the treatment;

following the treatment of the patient on a long-term basis and determining the costs associated with follow-up care of the patient;

prognosing a natural history of a disease of the patient; and

defining the long-term costs at inception of the treatment.

31. A method for pain management, comprising

storing information concerning disease and/or pain,

supplying medical information concerning a patient, and

processing functions relating to the medical information concerning the patient and information stored in the memory concerning disease and/or pain.

32. The method of claim 31, wherein said processing comprises correlating medical information concerning the patient and information concerning disease and/or pain to produce treatment information and/or to define costs.

33. The method of claim 31, wherein the information concerning disease and/or pain concerns relates to spasticity.

34. The method of claim 33, wherein said processing comprises correlating medical information concerning the patient and information concerning disease and/or pain relating to spasticity to provide a plan for treatment depending on whether the source of spasticity is spinal or cerebral.

35. The method of claim 34, wherein said processing comprising correlating information to provide a plan for treatment relative rehabilitative therapies, medications, motor block, intrathecal baclofen treatment, and surgical consultation.

36. The method of claim 31, wherein the information concerning disease and/or pain concerns relates to pain of auto-immune deficiency syndrome.

37. The method of claim 36, wherein said processing comprises correlating patient medical information with regard to severity of pain and provides information for initiating an analgesic ladder, including planning treatment based on level of pain, e.g., whether pain is mild, moderate or severe.

38. The method of claim 36, wherein said processing comprises correlating patient medical information with regard to the cause of pain and information concerning disease and/or pain for planning treatment using one or more of medications, druges, neurolytic block, mouth washes, antibiotics, local anesthetics, or the like.

39. The method of claim 31, said processing comprising providing processing functions relating to the treatment of the patient, storing in the memory historical data relating to treatment of the patient, and using the processor to plan appropriate treatment for the patient based on the patient's state and/or to define costs of long-term treatment of the patient *via* an outcome oriented approach using the historical data.

40. The method of claim 31, said processing including processing functions relating to the treatment of the patient, wherein the functions include:

planning appropriate treatment for the patient based on the patient's state;

defining the costs of long-term treatment of the patient *via* an outcome oriented approach using historical data relating to the state of the

patient, wherein the long-term costs are defined at inception of the treatment;

following the treatment of the patient on a long-term basis and determining the costs associated with follow-up care of the patient;

prognosing a natural history of a disease of the patient; and

defining the long-term costs at inception of the treatment.

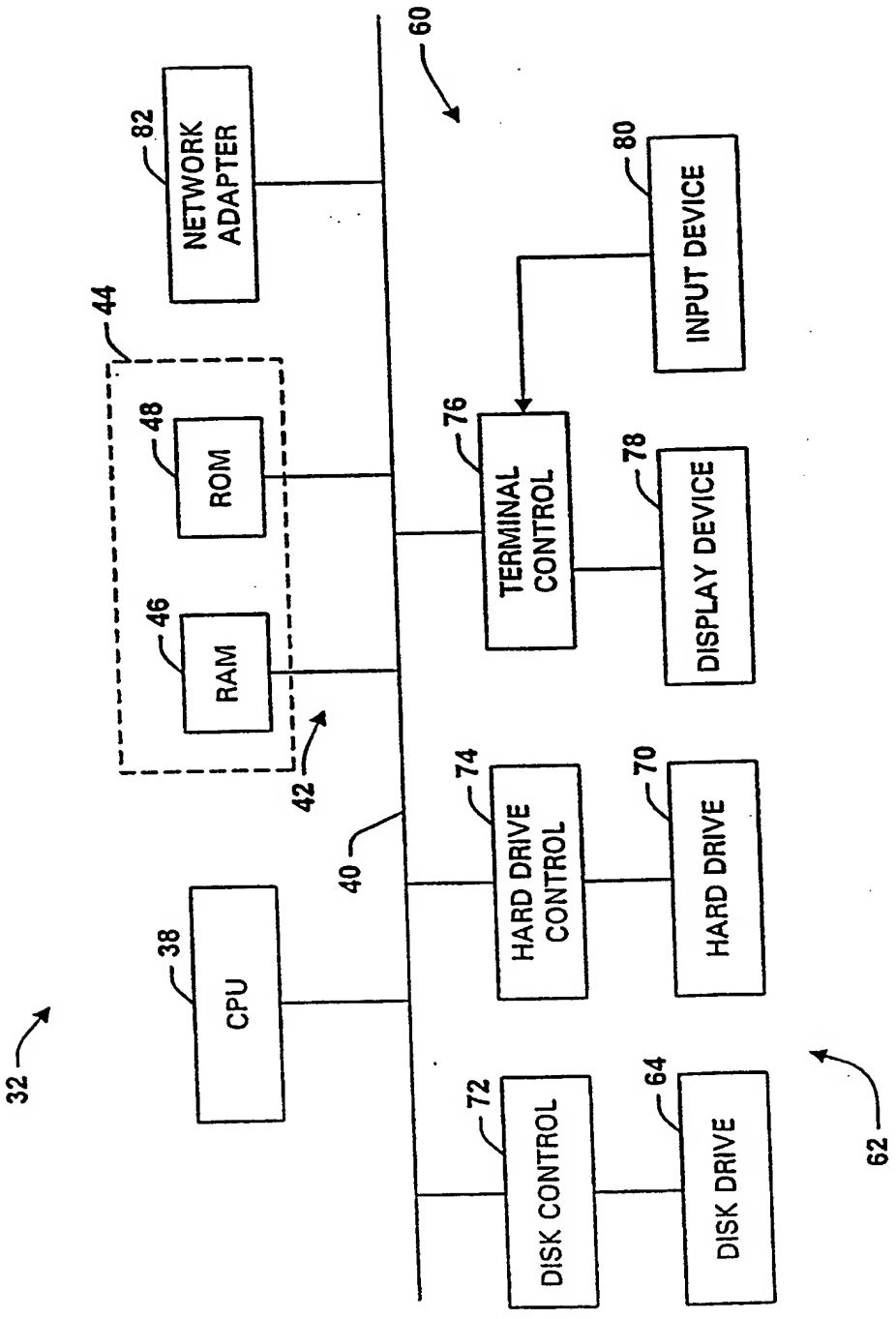


Fig. 1

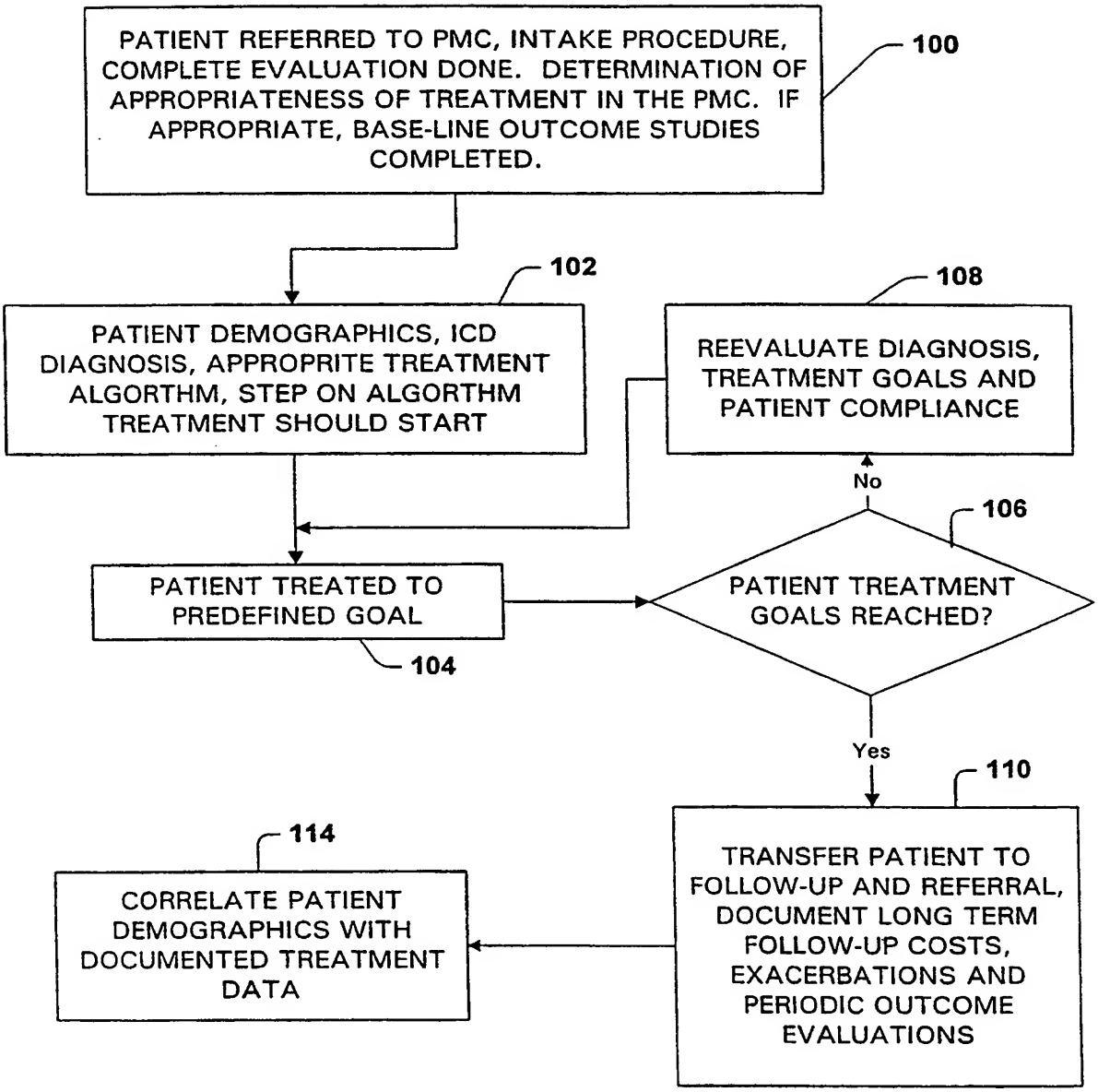


Fig. 2

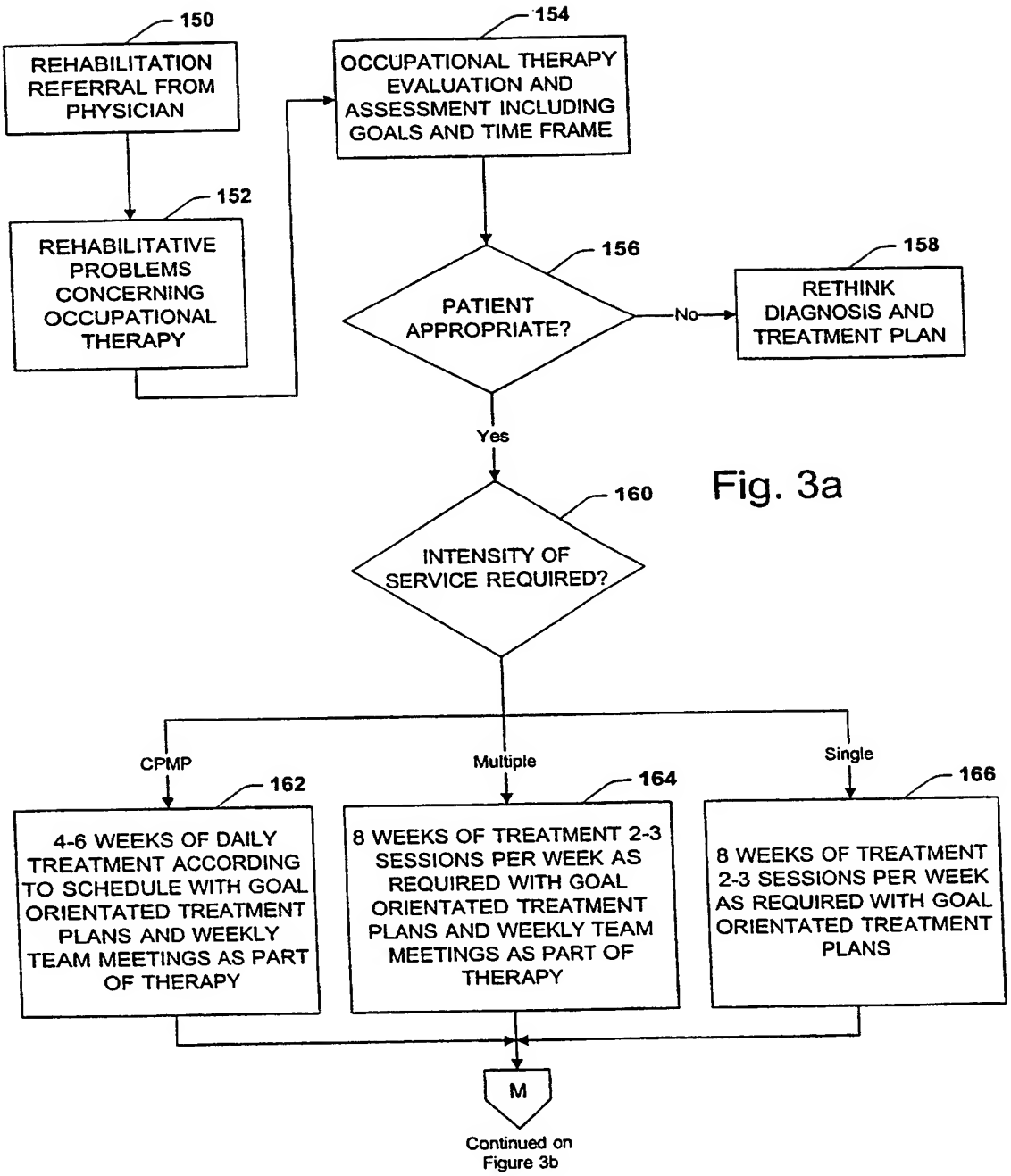

150
REHABILITATION REFERRAL FROM PHYSICIAN
152
REHABILITATIVE PROBLEMS CONCERNING OCCUPATIONAL THERAPY
154
OCCUPATIONAL THERAPY EVALUATION AND ASSESSMENT INCLUDING GOALS AND TIME FRAME
156
PATIENT APPROPRIATE?
No
158
RETHINK DIAGNOSIS AND TREATMENT PLAN
Yes
160
INTENSITY OF SERVICE REQUIRED?
CPMP
162
4-6 WEEKS OF DAILY TREATMENT ACCORDING TO SCHEDULE WITH GOAL ORIENTATED TREATMENT PLANS AND WEEKLY TEAM MEETINGS AS PART OF THERAPY
Multiple
164
8 WEEKS OF TREATMENT 2-3 SESSIONS PER WEEK AS REQUIRED WITH GOAL ORIENTATED TREATMENT PLANS AND WEEKLY TEAM MEETINGS AS PART OF THERAPY
Single
166
8 WEEKS OF TREATMENT 2-3 SESSIONS PER WEEK AS REQUIRED WITH GOAL ORIENTATED TREATMENT PLANS
M
Continued on Figure 3b

Fig. 3a

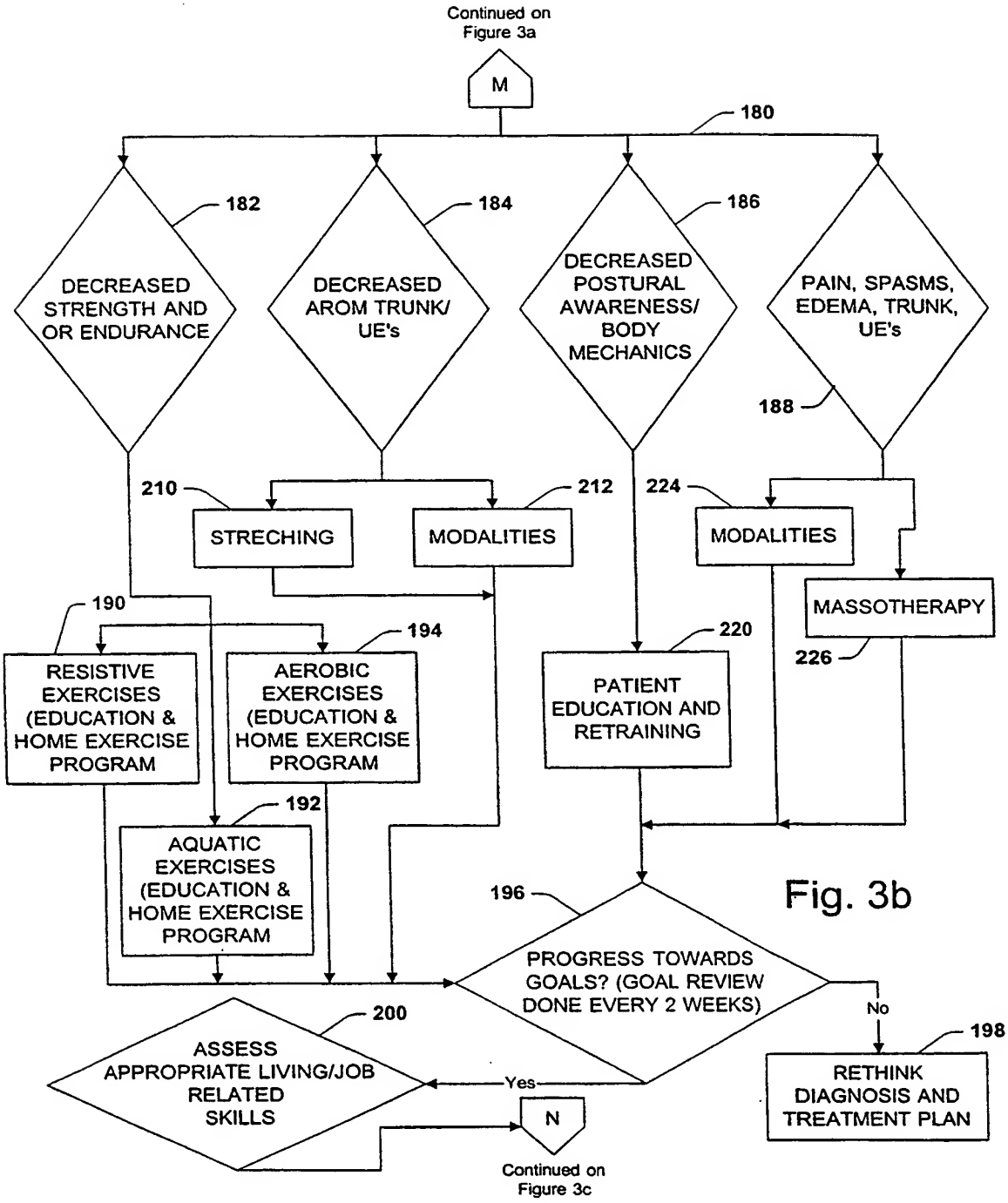

Continued on Figure 3a
M
180
182
DECREASED STRENGTH AND OR ENDURANCE
184
DECREASED AROM TRUNK/ UE's
186
DECREASED POSTURAL AWARENESS/ BODY MECHANICS
188
PAIN, SPASMS, EDEMA, TRUNK, UE's
210
STRECHING
212
MODALITIES
224
MODALITIES
MASSOTHERAPY
226
190
RESISTIVE EXERCISES (EDUCATION & HOME EXERCISE PROGRAM
194
AEROBIC EXERCISES (EDUCATION & HOME EXERCISE PROGRAM
220
PATIENT EDUCATION AND RETRAINING
192
AQUATIC EXERCISES (EDUCATION & HOME EXERCISE PROGRAM
196
PROGRESS TOWARDS GOALS? (GOAL REVIEW DONE EVERY 2 WEEKS)
No
198
RETHINK DIAGNOSIS AND TREATMENT PLAN
200
ASSESS APPROPRIATE LIVING/JOB RELATED SKILLS
Yes
N
Continued on Figure 3c

Fig. 3b

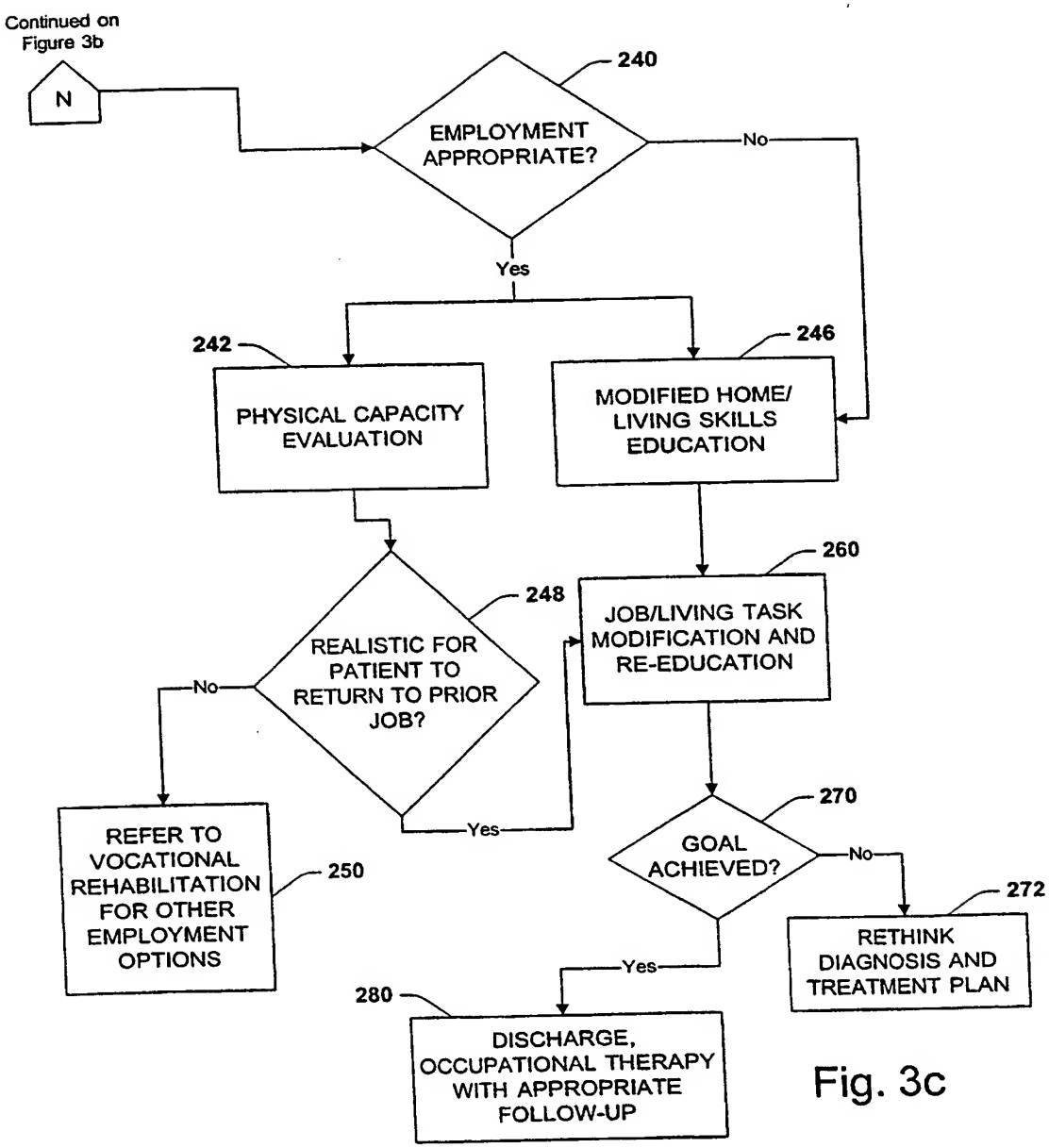

Continued on Figure 3b
N
240
EMPLOYMENT APPROPRIATE?
No
Yes
242
PHYSICAL CAPACITY EVALUATION
246
MODIFIED HOME/ LIVING SKILLS EDUCATION
260
JOB/LIVING TASK MODIFICATION AND RE-EDUCATION
248
REALISTIC FOR PATIENT TO RETURN TO PRIOR JOB?
No
Yes
REFER TO VOCATIONAL REHABILITATION FOR OTHER EMPLOYMENT OPTIONS
250
270
GOAL ACHIEVED?
No
Yes
272
RETHINK DIAGNOSIS AND TREATMENT PLAN
280
DISCHARGE, OCCUPATIONAL THERAPY WITH APPROPRIATE FOLLOW-UP

Fig. 3c

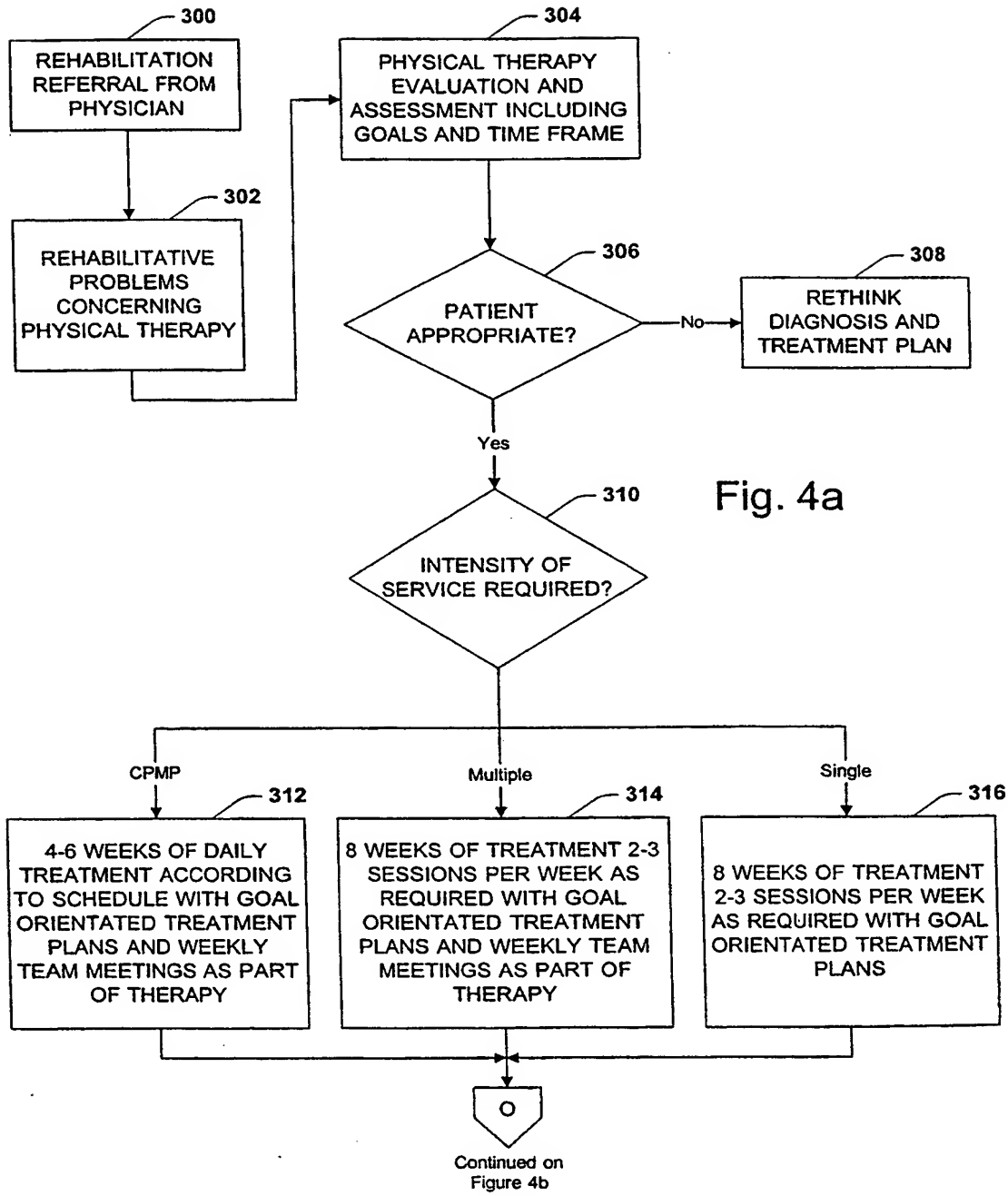

300
REHABILITATION REFERRAL FROM PHYSICIAN
302
REHABILITATIVE PROBLEMS CONCERNING PHYSICAL THERAPY
304
PHYSICAL THERAPY EVALUATION AND ASSESSMENT INCLUDING GOALS AND TIME FRAME
306
PATIENT APPROPRIATE?
No
308
RETHINK DIAGNOSIS AND TREATMENT PLAN
Yes
310
INTENSITY OF SERVICE REQUIRED?
CPMP
312
4-6 WEEKS OF DAILY TREATMENT ACCORDING TO SCHEDULE WITH GOAL ORIENTATED TREATMENT PLANS AND WEEKLY TEAM MEETINGS AS PART OF THERAPY
Multiple
314
8 WEEKS OF TREATMENT 2-3 SESSIONS PER WEEK AS REQUIRED WITH GOAL ORIENTATED TREATMENT PLANS AND WEEKLY TEAM MEETINGS AS PART OF THERAPY
Single
316
8 WEEKS OF TREATMENT 2-3 SESSIONS PER WEEK AS REQUIRED WITH GOAL ORIENTATED TREATMENT PLANS
O
Continued on Figure 4b

Fig. 4a

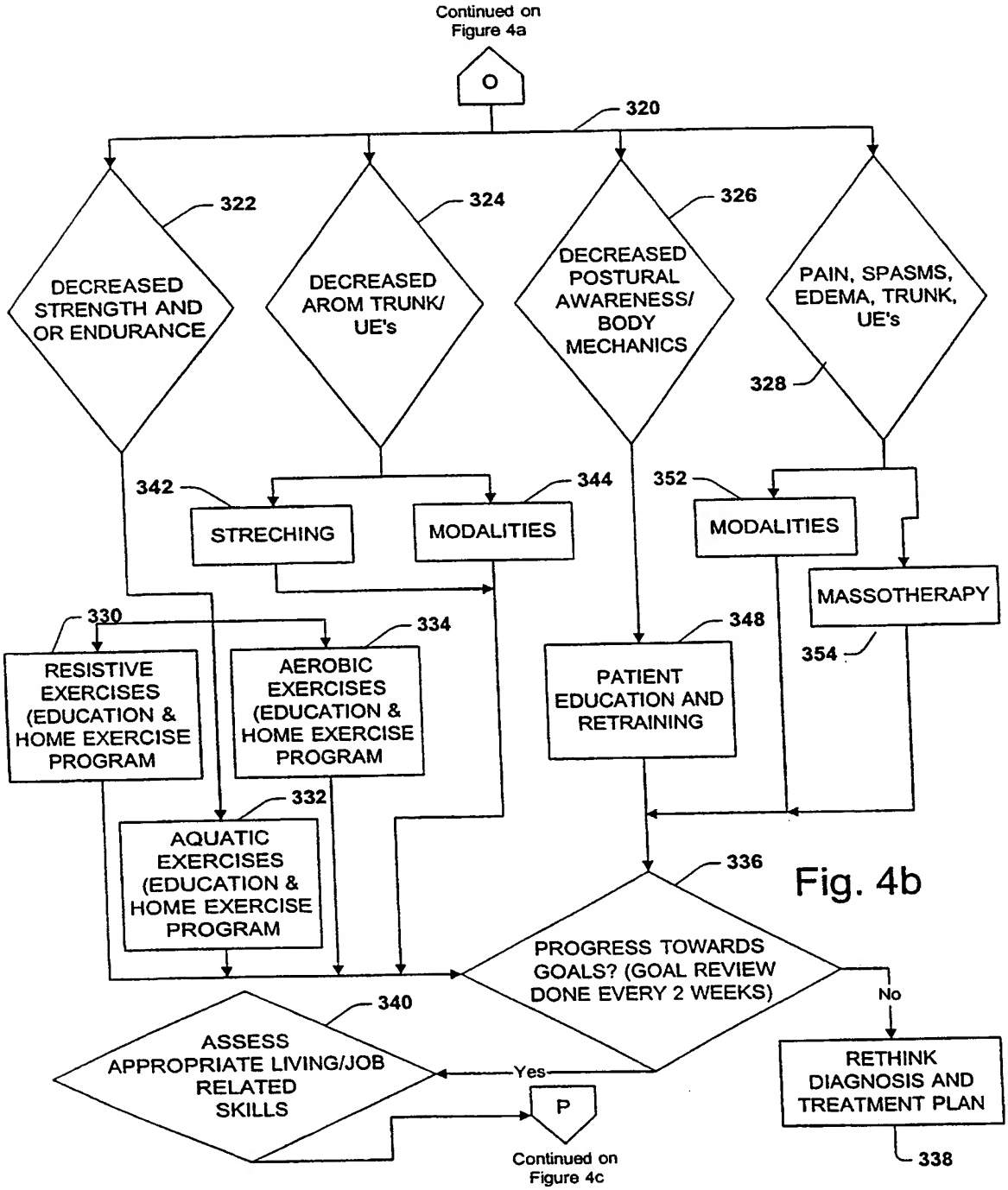

Continued on Figure 4a
O
320
322
DECREASED STRENGTH AND OR ENDURANCE
324
DECREASED AROM TRUNK/ UE's
326
DECREASED POSTURAL AWARENESS/ BODY MECHANICS
328
PAIN, SPASMS, EDEMA, TRUNK, UE's
342
STRECHING
344
MODALITIES
352
MODALITIES
MASSOTHERAPY
330
RESISTIVE EXERCISES (EDUCATION & HOME EXERCISE PROGRAM
334
AEROBIC EXERCISES (EDUCATION & HOME EXERCISE PROGRAM
348
PATIENT EDUCATION AND RETRAINING
354
332
AQUATIC EXERCISES (EDUCATION & HOME EXERCISE PROGRAM
336
PROGRESS TOWARDS GOALS? (GOAL REVIEW DONE EVERY 2 WEEKS)
No
340
ASSESS APPROPRIATE LIVING/JOB RELATED SKILLS
Yes
RETHINK DIAGNOSIS AND TREATMENT PLAN
338
P
Continued on Figure 4c

Fig. 4b

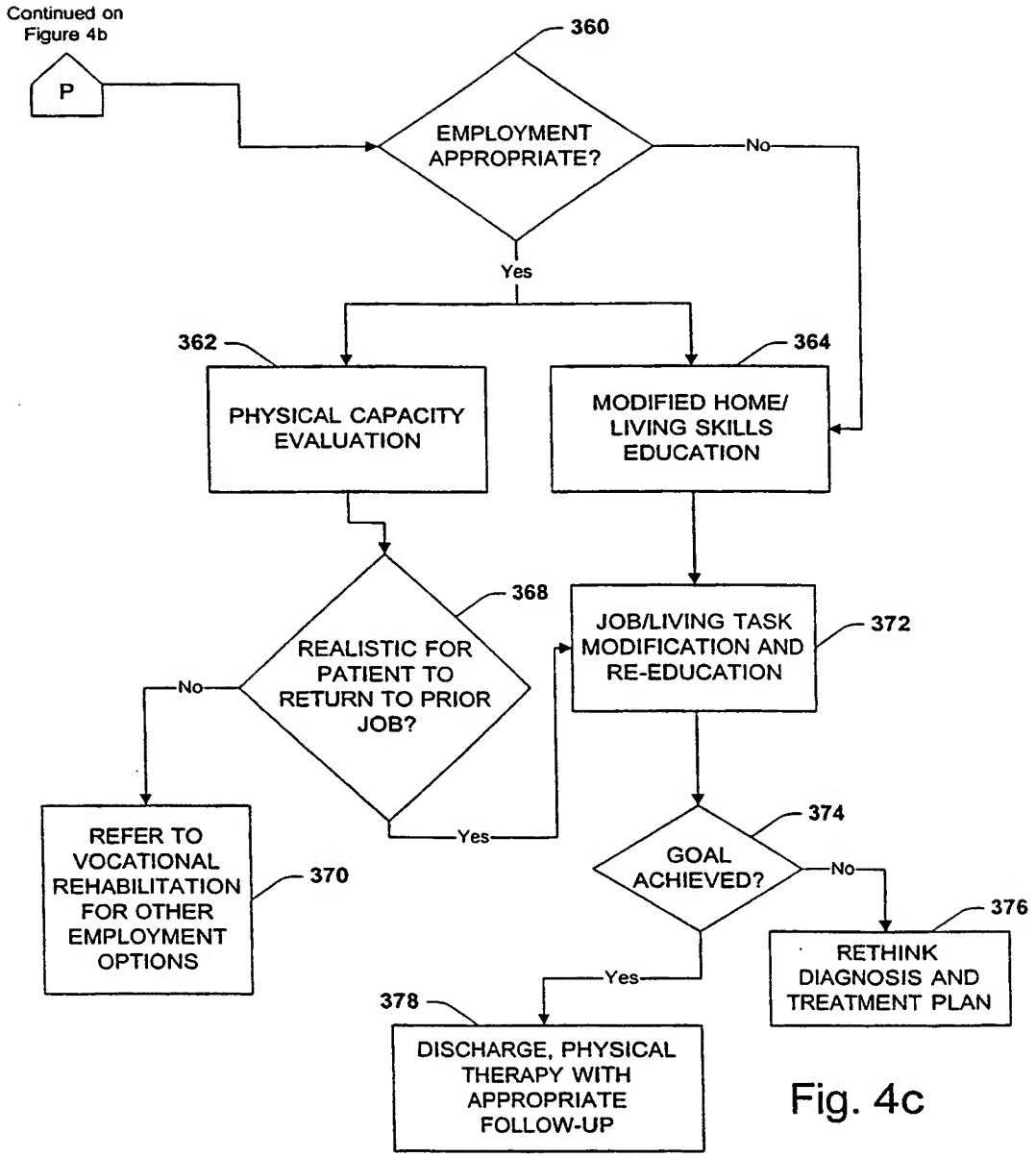

Continued on Figure 4b
P
360
EMPLOYMENT APPROPRIATE?
No
Yes
362
PHYSICAL CAPACITY EVALUATION
364
MODIFIED HOME/ LIVING SKILLS EDUCATION
368
REALISTIC FOR PATIENT TO RETURN TO PRIOR JOB?
No
Yes
372
JOB/LIVING TASK MODIFICATION AND RE-EDUCATION
370
REFER TO VOCATIONAL REHABILITATION FOR OTHER EMPLOYMENT OPTIONS
374
GOAL ACHIEVED?
No
Yes
376
RETHINK DIAGNOSIS AND TREATMENT PLAN
378
DISCHARGE, PHYSICAL THERAPY WITH APPROPRIATE FOLLOW-UP

Fig. 4c

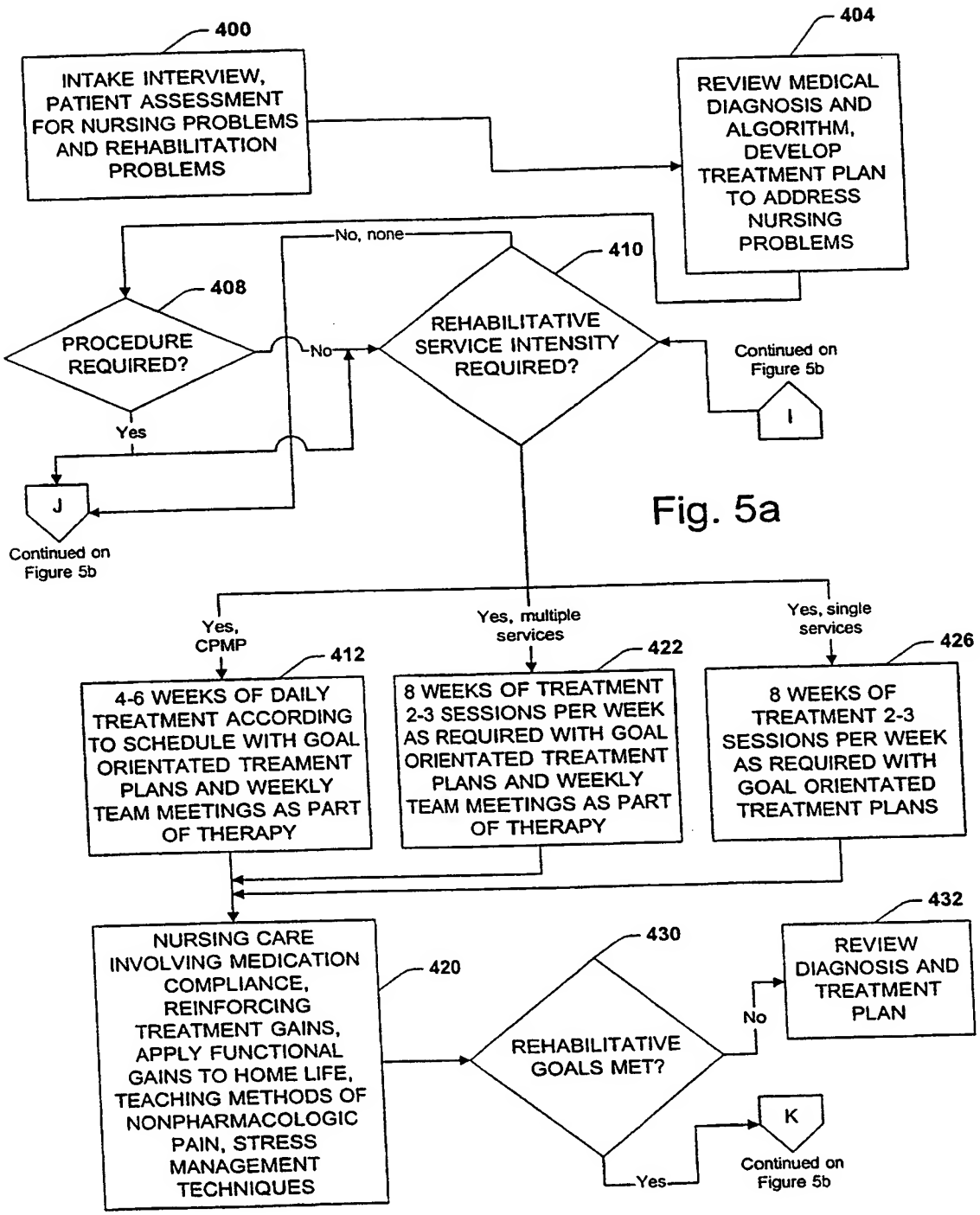

400
INTAKE INTERVIEW, PATIENT ASSESSMENT FOR NURSING PROBLEMS AND REHABILITATION PROBLEMS
404
REVIEW MEDICAL DIAGNOSIS AND ALGORITHM, DEVELOP TREATMENT PLAN TO ADDRESS NURSING PROBLEMS
408
PROCEDURE REQUIRED?
No, none
No
410
REHABILITATIVE SERVICE INTENSITY REQUIRED?
Continued on Figure 5b
I
Yes
J
Continued on Figure 5b
Yes, CPMP
412
4-6 WEEKS OF DAILY TREATMENT ACCORDING TO SCHEDULE WITH GOAL ORIENTATED TREAMENT PLANS AND WEEKLY TEAM MEETINGS AS PART OF THERAPY
Yes, multiple services
422
8 WEEKS OF TREATMENT 2-3 SESSIONS PER WEEK AS REQUIRED WITH GOAL ORIENTATED TREATMENT PLANS AND WEEKLY TEAM MEETINGS AS PART OF THERAPY
Yes, single services
426
8 WEEKS OF TREATMENT 2-3 SESSIONS PER WEEK AS REQUIRED WITH GOAL ORIENTATED TREATMENT PLANS
NURSING CARE INVOLVING MEDICATION COMPLIANCE, REINFORCING TREATMENT GAINS, APPLY FUNCTIONAL GAINS TO HOME LIFE, TEACHING METHODS OF NONPHARMACOLOGIC PAIN, STRESS MANAGEMENT TECHNIQUES
420
430
REHABILITATIVE GOALS MET?
No
432
REVIEW DIAGNOSIS AND TREATMENT PLAN
Yes
K
Continued on Figure 5b

Fig. 5a

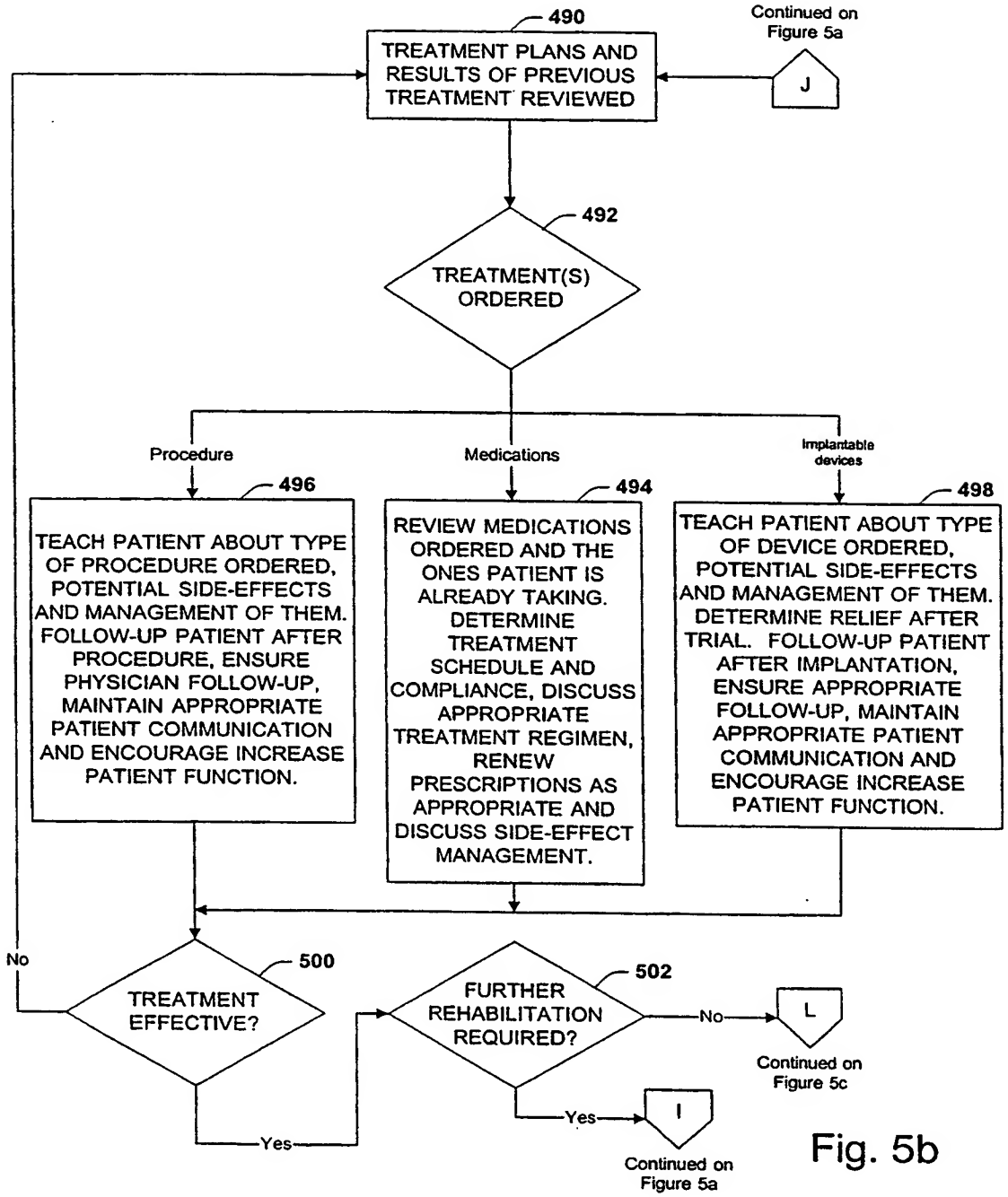

490
TREATMENT PLANS AND RESULTS OF PREVIOUS TREATMENT REVIEWED
Continued on Figure 5a
J
492
TREATMENT(S) ORDERED
Procedure
Medications
Implantable devices
496
TEACH PATIENT ABOUT TYPE OF PROCEDURE ORDERED, POTENTIAL SIDE-EFFECTS AND MANAGEMENT OF THEM. FOLLOW-UP PATIENT AFTER PROCEDURE, ENSURE PHYSICIAN FOLLOW-UP, MAINTAIN APPROPRIATE PATIENT COMMUNICATION AND ENCOURAGE INCREASE PATIENT FUNCTION.
494
REVIEW MEDICATIONS ORDERED AND THE ONES PATIENT IS ALREADY TAKING. DETERMINE TREATMENT SCHEDULE AND COMPLIANCE, DISCUSS APPROPRIATE TREATMENT REGIMEN, RENEW PRESCRIPTIONS AS APPROPRIATE AND DISCUSS SIDE-EFFECT MANAGEMENT.
498
TEACH PATIENT ABOUT TYPE OF DEVICE ORDERED, POTENTIAL SIDE-EFFECTS AND MANAGEMENT OF THEM. DETERMINE RELIEF AFTER TRIAL. FOLLOW-UP PATIENT AFTER IMPLANTATION, ENSURE APPROPRIATE FOLLOW-UP, MAINTAIN APPROPRIATE PATIENT COMMUNICATION AND ENCOURAGE INCREASE PATIENT FUNCTION.
No
500
TREATMENT EFFECTIVE?
Yes
502
FURTHER REHABILITATION REQUIRED?
No
L
Continued on Figure 5c
Yes
I
Continued on Figure 5a

Fig. 5b

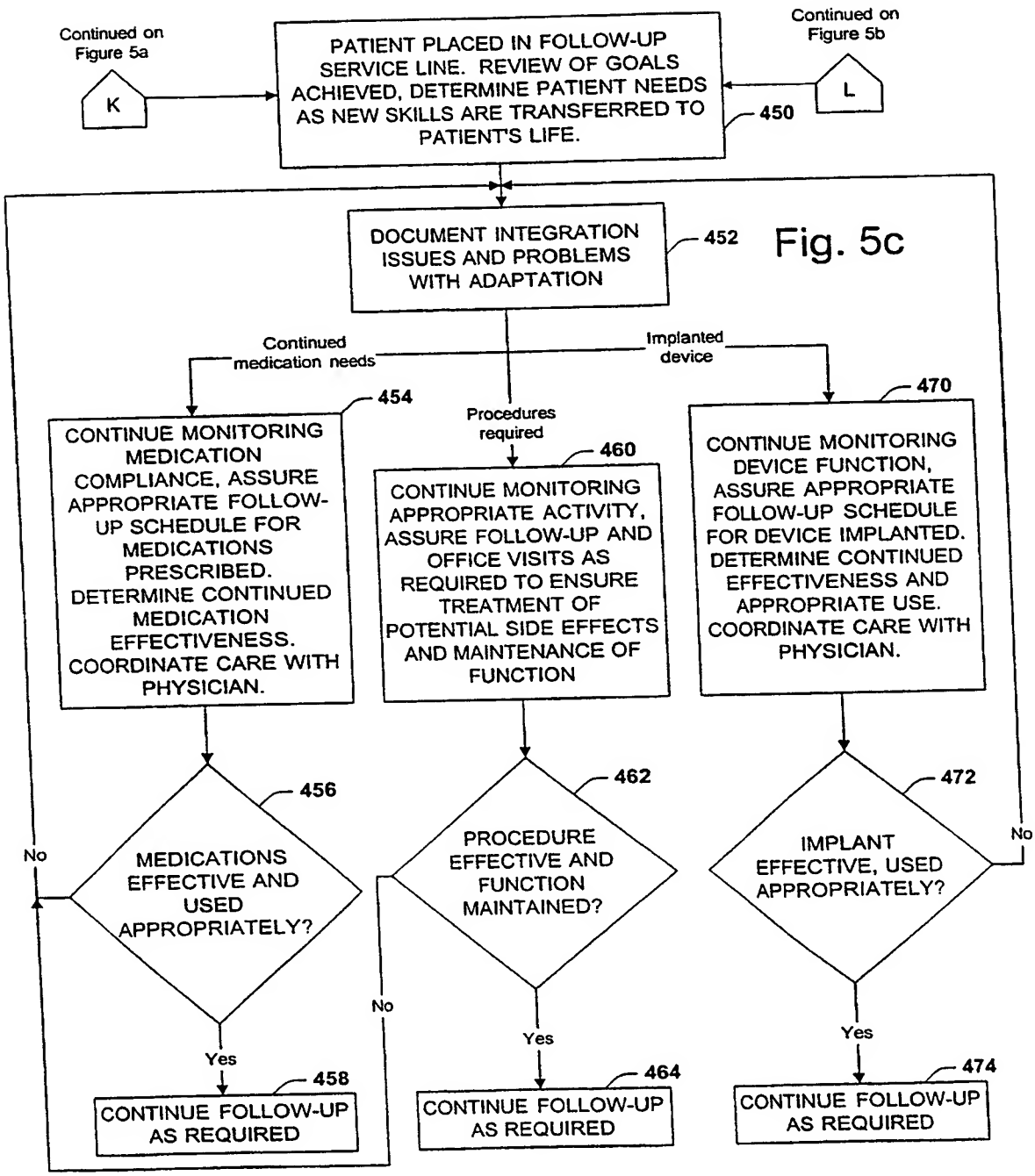

Continued on Figure 5a
K
PATIENT PLACED IN FOLLOW-UP SERVICE LINE. REVIEW OF GOALS ACHIEVED, DETERMINE PATIENT NEEDS AS NEW SKILLS ARE TRANSFERRED TO PATIENT'S LIFE.
450
Continued on Figure 5b
L
DOCUMENT INTEGRATION ISSUES AND PROBLEMS WITH ADAPTATION
452
Continued medication needs
Procedures required
Implanted device
454
CONTINUE MONITORING MEDICATION COMPLIANCE, ASSURE APPROPRIATE FOLLOW-UP SCHEDULE FOR MEDICATIONS PRESCRIBED. DETERMINE CONTINUED MEDICATION EFFECTIVENESS. COORDINATE CARE WITH PHYSICIAN.
460
CONTINUE MONITORING APPROPRIATE ACTIVITY, ASSURE FOLLOW-UP AND OFFICE VISITS AS REQUIRED TO ENSURE TREATMENT OF POTENTIAL SIDE EFFECTS AND MAINTENANCE OF FUNCTION
470
CONTINUE MONITORING DEVICE FUNCTION, ASSURE APPROPRIATE FOLLOW-UP SCHEDULE FOR DEVICE IMPLANTED. DETERMINE CONTINUED EFFECTIVENESS AND APPROPRIATE USE. COORDINATE CARE WITH PHYSICIAN.
456
MEDICATIONS EFFECTIVE AND USED APPROPRIATELY?
462
PROCEDURE EFFECTIVE AND FUNCTION MAINTAINED?
472
IMPLANT EFFECTIVE, USED APPROPRIATELY?
No
No
No
Yes
Yes
Yes
458
CONTINUE FOLLOW-UP AS REQUIRED
464
CONTINUE FOLLOW-UP AS REQUIRED
474
CONTINUE FOLLOW-UP AS REQUIRED

Fig. 5c

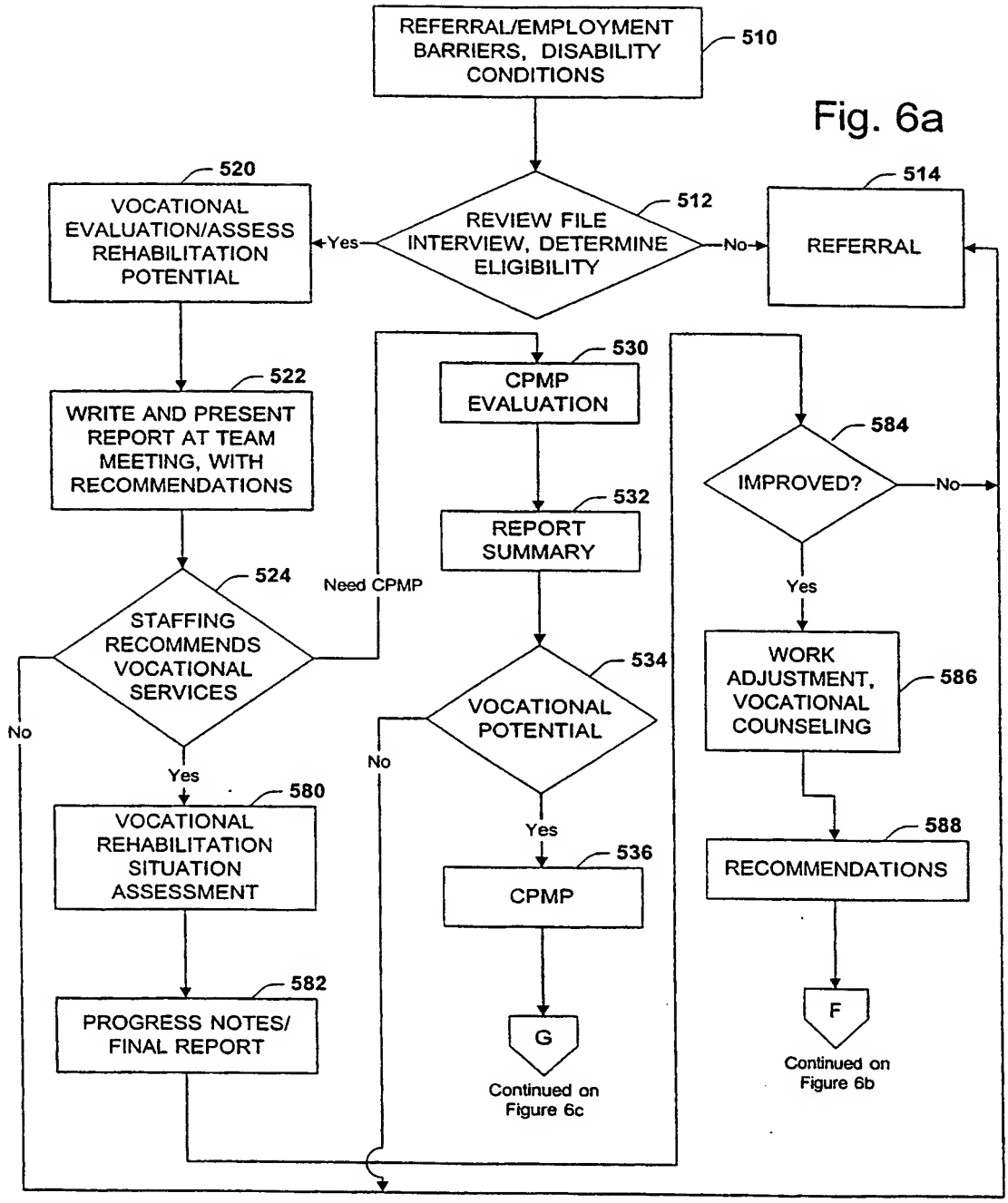

REFERRAL/EMPLOYMENT BARRIERS, DISABILITY CONDITIONS
510
REVIEW FILE INTERVIEW, DETERMINE ELIGIBILITY
512
Yes
No
VOCATIONAL EVALUATION/ASSESS REHABILITATION POTENTIAL
520
REFERRAL
514
WRITE AND PRESENT REPORT AT TEAM MEETING, WITH RECOMMENDATIONS
522
CPMP EVALUATION
530
REPORT SUMMARY
532
STAFFING RECOMMENDS VOCATIONAL SERVICES
524
Need CPMP
No
Yes
VOCATIONAL POTENTIAL
534
No
Yes
IMPROVED?
584
No
Yes
VOCATIONAL REHABILITATION SITUATION ASSESSMENT
580
CPMP
536
WORK ADJUSTMENT, VOCATIONAL COUNSELING
586
RECOMMENDATIONS
588
PROGRESS NOTES/ FINAL REPORT
582
G
Continued on Figure 6c
F
Continued on Figure 6b

Fig. 6a

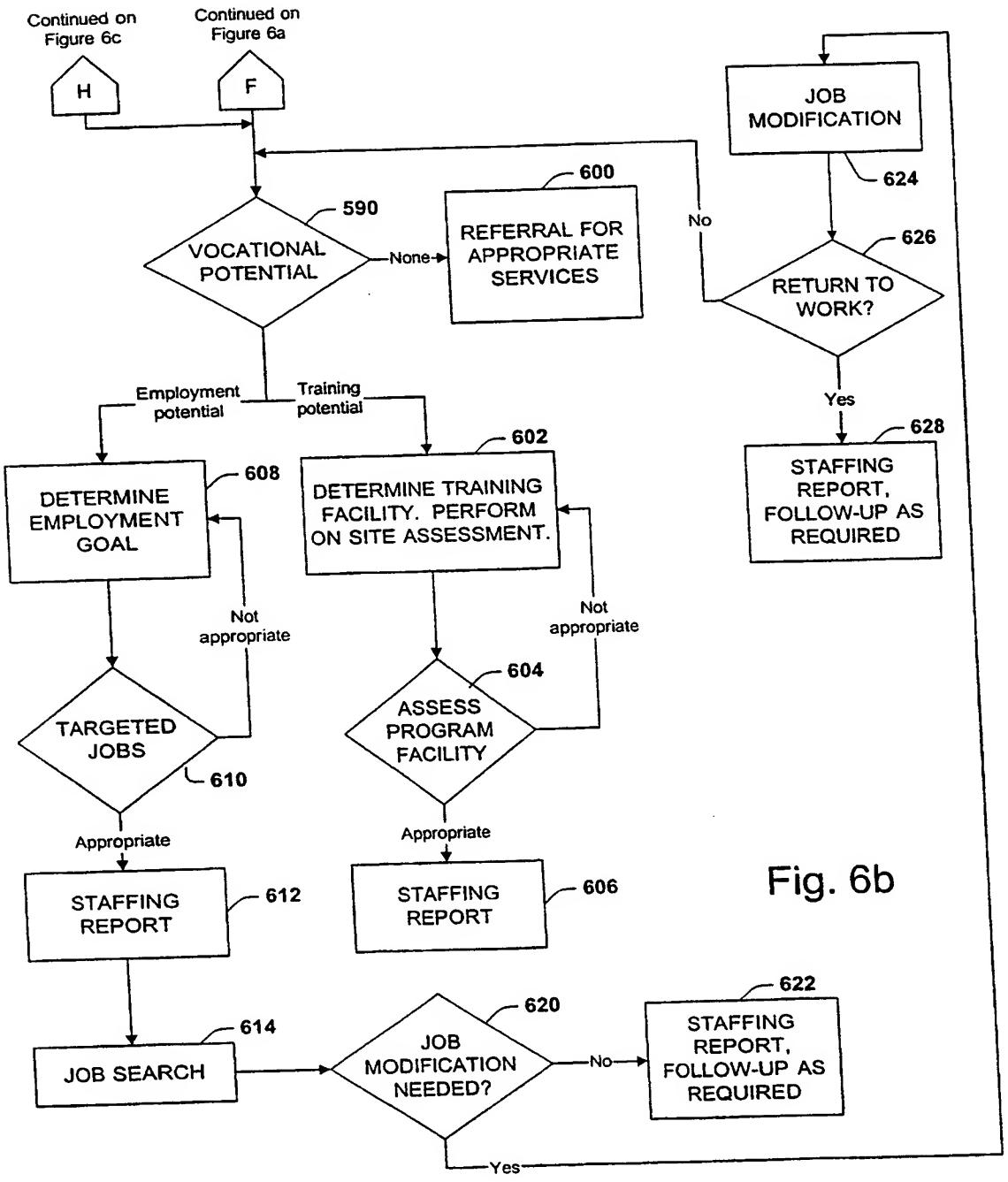

Continued on Figure 6c
H
Continued on Figure 6a
F
JOB MODIFICATION
624
600
590
VOCATIONAL POTENTIAL
None
REFERRAL FOR APPROPRIATE SERVICES
No
626
RETURN TO WORK?
Yes
628
STAFFING REPORT, FOLLOW-UP AS REQUIRED
Employment potential
Training potential
602
608
DETERMINE EMPLOYMENT GOAL
DETERMINE TRAINING FACILITY. PERFORM ON SITE ASSESSMENT.
Not appropriate
Not appropriate
604
TARGETED JOBS
610
ASSESS PROGRAM FACILITY
Appropriate
Appropriate
STAFFING REPORT
612
STAFFING REPORT
606
614
JOB SEARCH
620
JOB MODIFICATION NEEDED?
No
622
STAFFING REPORT, FOLLOW-UP AS REQUIRED
Yes

Fig. 6b

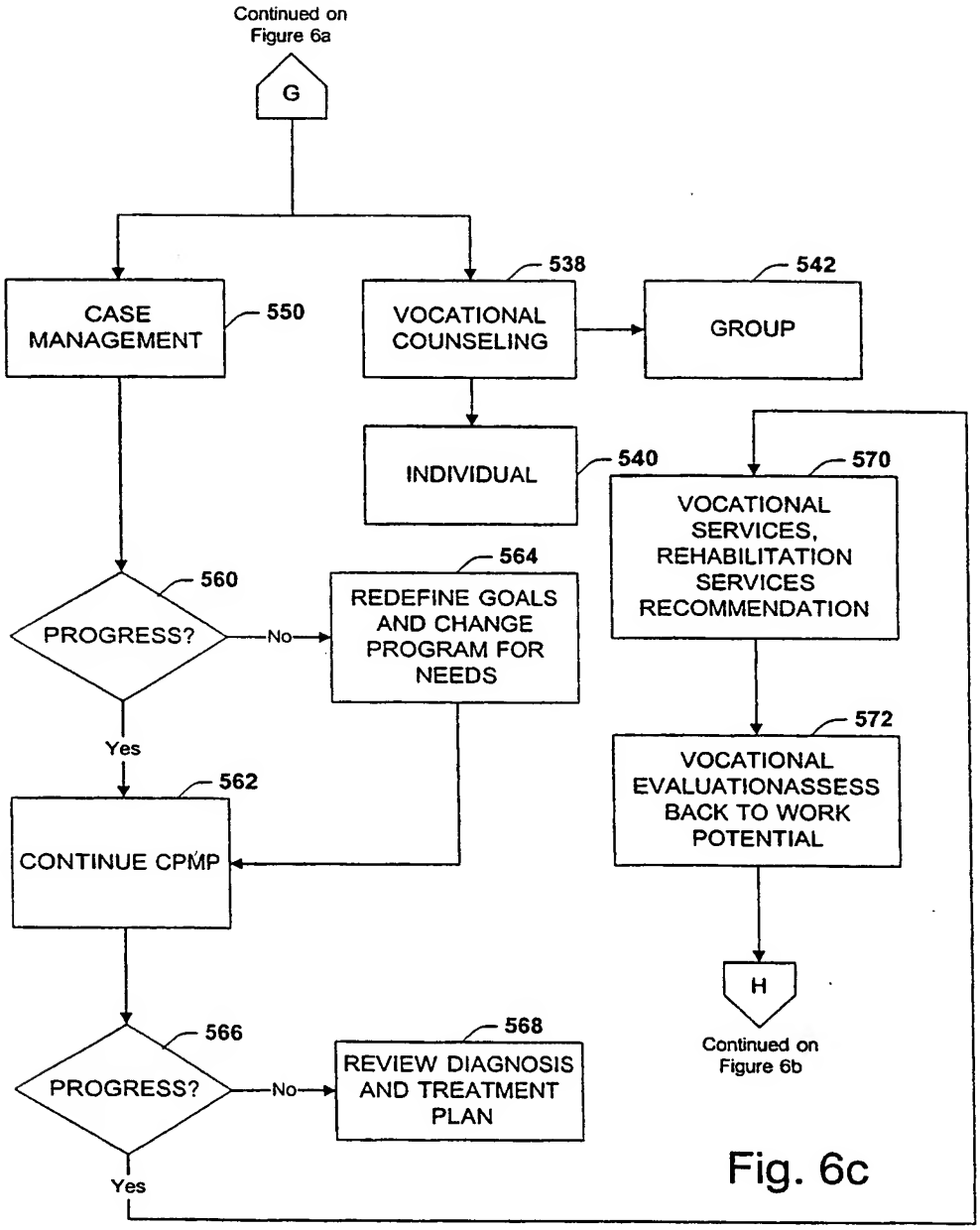

Continued on Figure 6a
G
CASE MANAGEMENT
550
VOCATIONAL COUNSELING
538
GROUP
542
INDIVIDUAL
540
VOCATIONAL SERVICES, REHABILITATION SERVICES RECOMMENDATION
570
PROGRESS?
560
No
REDEFINE GOALS AND CHANGE PROGRAM FOR NEEDS
564
Yes
CONTINUE CPMP
562
VOCATIONAL EVALUATIONASSESS BACK TO WORK POTENTIAL
572
H
Continued on Figure 6b
PROGRESS?
566
No
REVIEW DIAGNOSIS AND TREATMENT PLAN
568
Yes

Fig. 6c

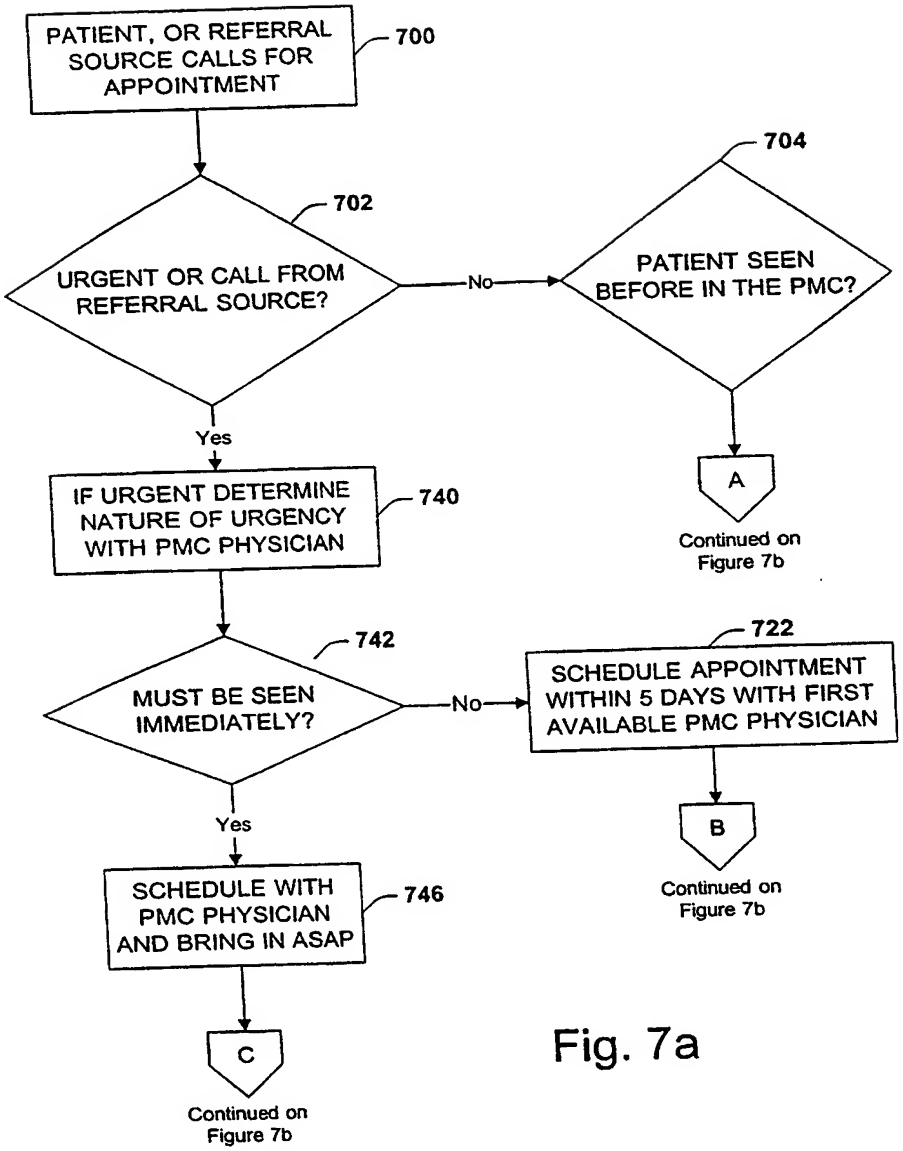

PATIENT, OR REFERRAL SOURCE CALLS FOR APPOINTMENT
700
URGENT OR CALL FROM REFERRAL SOURCE?
702
No
PATIENT SEEN BEFORE IN THE PMC?
704
Yes
IF URGENT DETERMINE NATURE OF URGENCY WITH PMC PHYSICIAN
740
A
Continued on Figure 7b
MUST BE SEEN IMMEDIATELY?
742
No
SCHEDULE APPOINTMENT WITHIN 5 DAYS WITH FIRST AVAILABLE PMC PHYSICIAN
722
Yes
B
Continued on Figure 7b
SCHEDULE WITH PMC PHYSICIAN AND BRING IN ASAP
746
C
Continued on Figure 7b

Fig. 7a

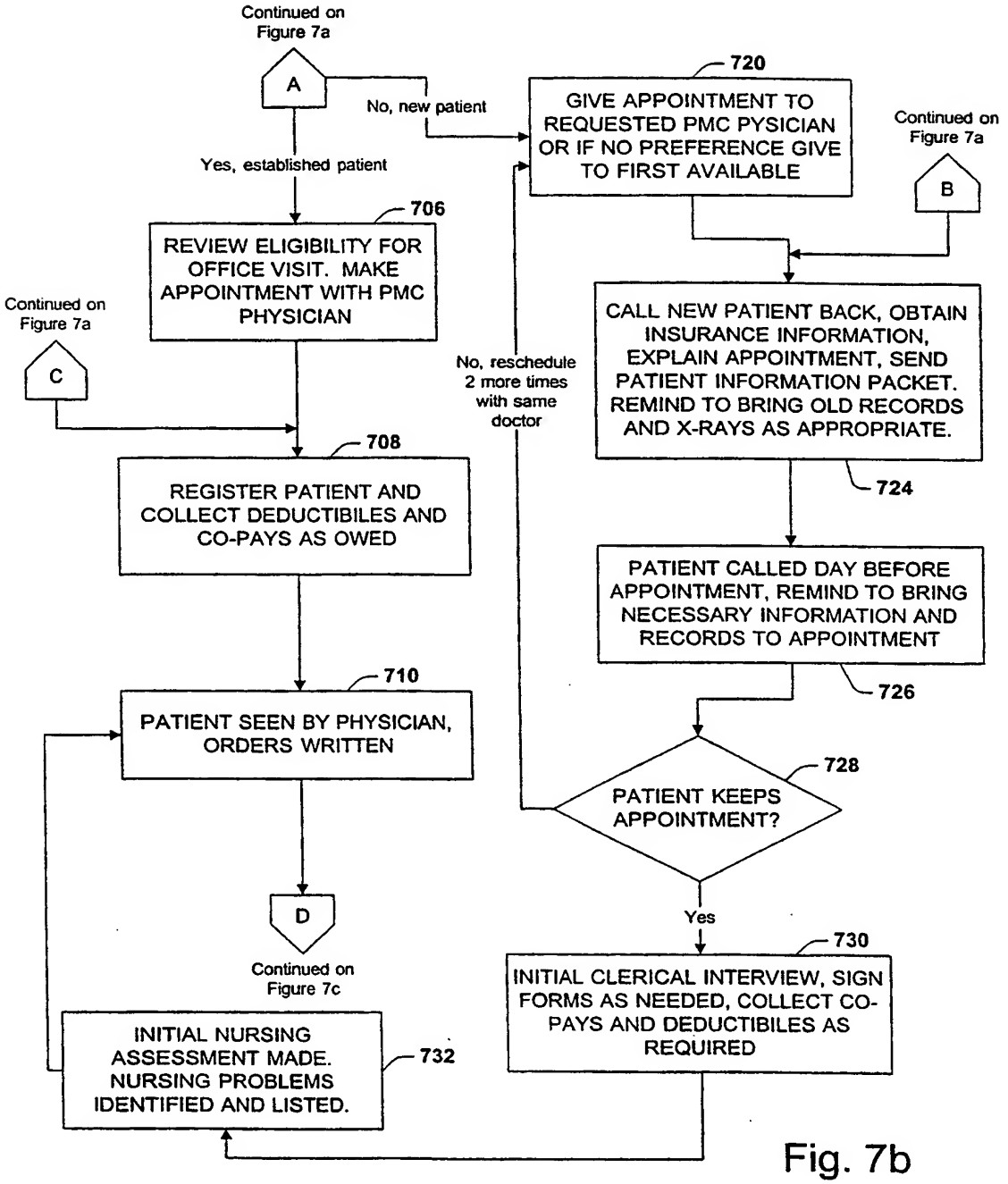

Continued on Figure 7a
A
No, new patient
Yes, established patient
720
GIVE APPOINTMENT TO REQUESTED PMC PYSICIAN OR IF NO PREFERENCE GIVE TO FIRST AVAILABLE
Continued on Figure 7a
B
706
REVIEW ELIGIBILITY FOR OFFICE VISIT. MAKE APPOINTMENT WITH PMC PHYSICIAN
Continued on Figure 7a
C
No, reschedule 2 more times with same doctor
CALL NEW PATIENT BACK, OBTAIN INSURANCE INFORMATION, EXPLAIN APPOINTMENT, SEND PATIENT INFORMATION PACKET. REMIND TO BRING OLD RECORDS AND X-RAYS AS APPROPRIATE.
724
708
REGISTER PATIENT AND COLLECT DEDUCTIBILES AND CO-PAYS AS OWED
PATIENT CALLED DAY BEFORE APPOINTMENT, REMIND TO BRING NECESSARY INFORMATION AND RECORDS TO APPOINTMENT
726
710
PATIENT SEEN BY PHYSICIAN, ORDERS WRITTEN
728
PATIENT KEEPS APPOINTMENT?
D
Continued on Figure 7c
Yes
730
INITIAL CLERICAL INTERVIEW, SIGN FORMS AS NEEDED, COLLECT CO-PAYS AND DEDUCTIBILES AS REQUIRED
INITIAL NURSING ASSESSMENT MADE. NURSING PROBLEMS IDENTIFIED AND LISTED.
732

Fig. 7b

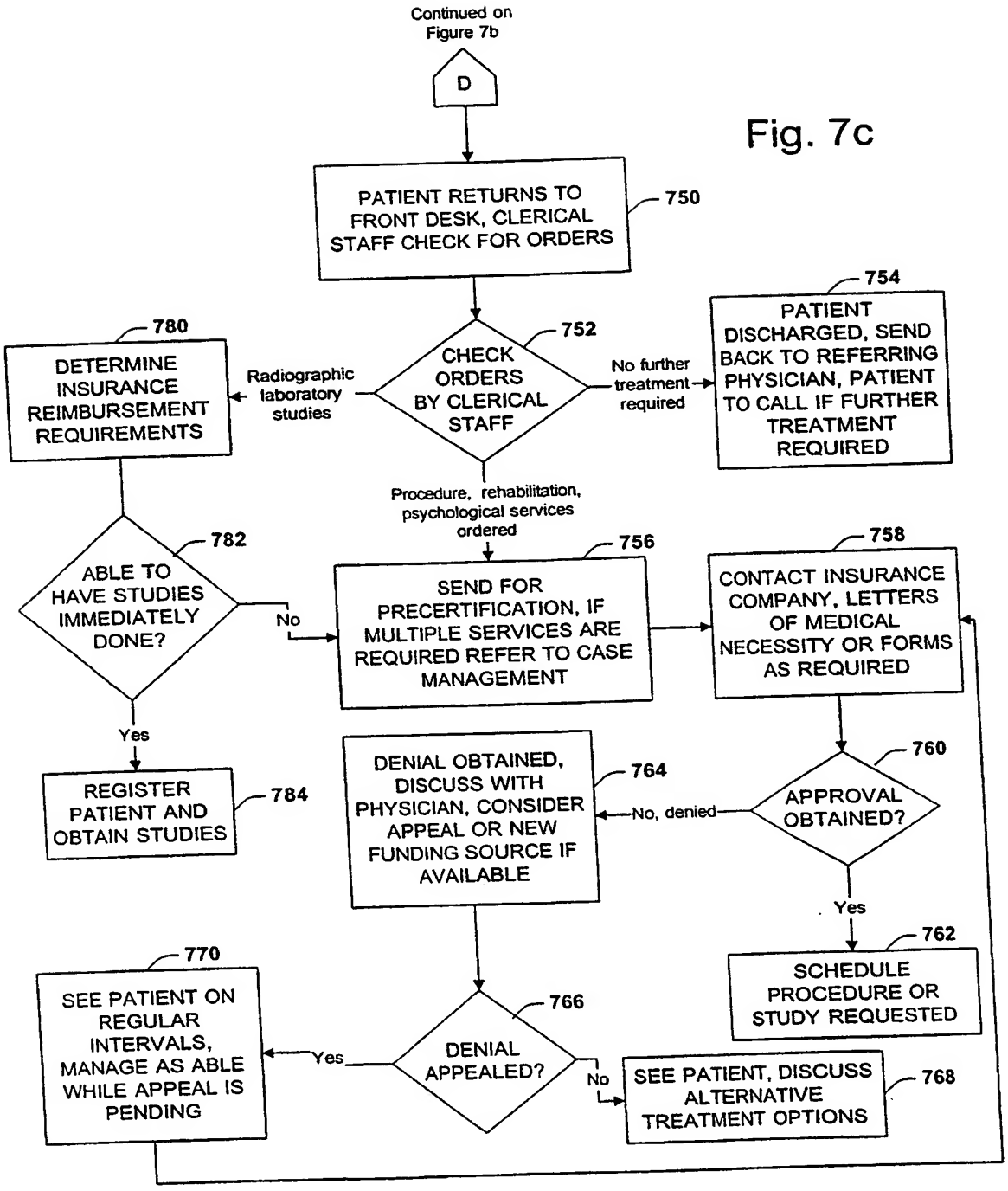

Continued on Figure 7b
D
PATIENT RETURNS TO FRONT DESK, CLERICAL STAFF CHECK FOR ORDERS
750
CHECK ORDERS BY CLERICAL STAFF
752
No further treatment required
PATIENT DISCHARGED, SEND BACK TO REFERRING PHYSICIAN, PATIENT TO CALL IF FURTHER TREATMENT REQUIRED
754
Radiographic laboratory studies
DETERMINE INSURANCE REIMBURSEMENT REQUIREMENTS
780
Procedure, rehabilitation, psychological services ordered
ABLE TO HAVE STUDIES IMMEDIATELY DONE?
782
No
SEND FOR PRECERTIFICATION, IF MULTIPLE SERVICES ARE REQUIRED REFER TO CASE MANAGEMENT
756
CONTACT INSURANCE COMPANY, LETTERS OF MEDICAL NECESSITY OR FORMS AS REQUIRED
758
Yes
REGISTER PATIENT AND OBTAIN STUDIES
784
DENIAL OBTAINED, DISCUSS WITH PHYSICIAN, CONSIDER APPEAL OR NEW FUNDING SOURCE IF AVAILABLE
764
No, denied
APPROVAL OBTAINED?
760
Yes
SCHEDULE PROCEDURE OR STUDY REQUESTED
762
SEE PATIENT ON REGULAR INTERVALS, MANAGE AS ABLE WHILE APPEAL IS PENDING
770
Yes
DENIAL APPEALED?
766
No
SEE PATIENT, DISCUSS ALTERNATIVE TREATMENT OPTIONS
768

Fig. 7c

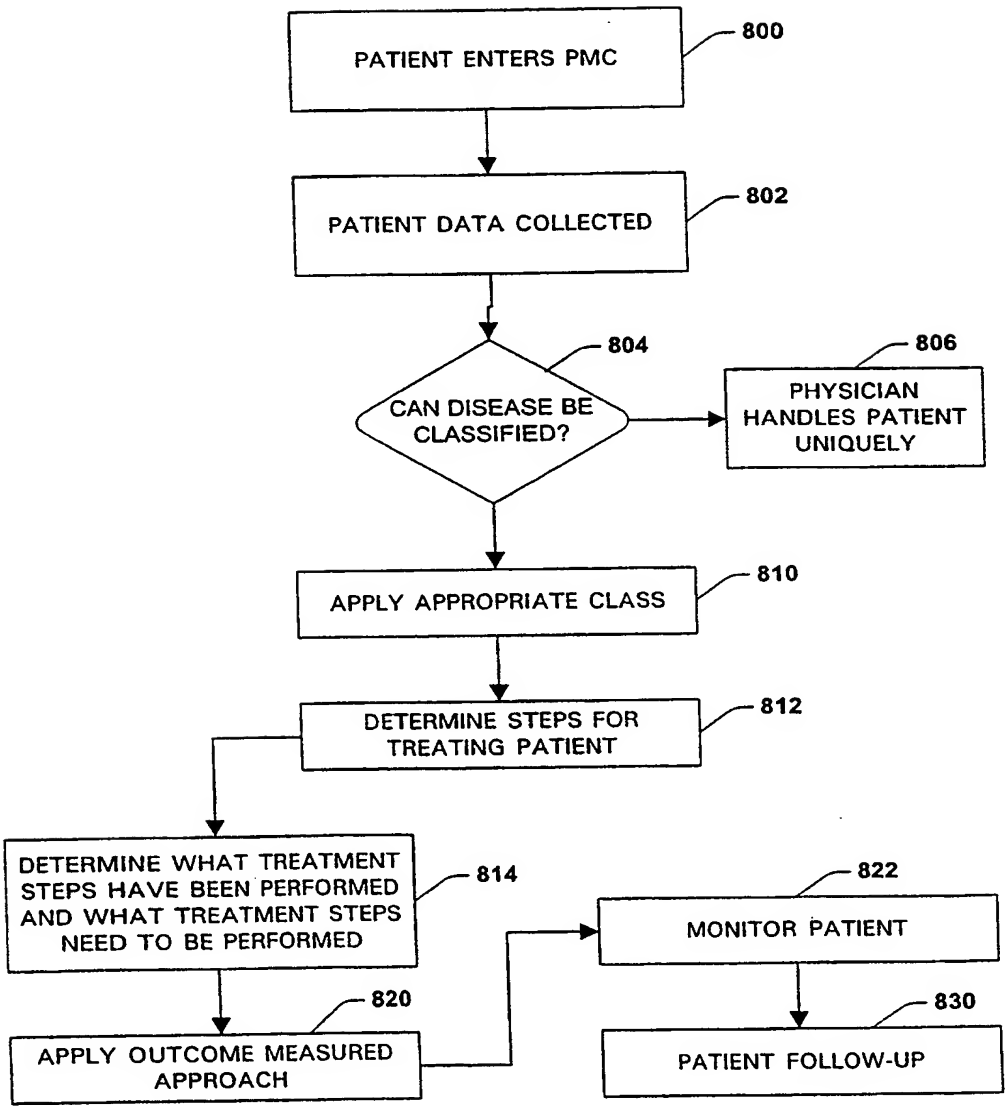


Fig. 8

Spasticity

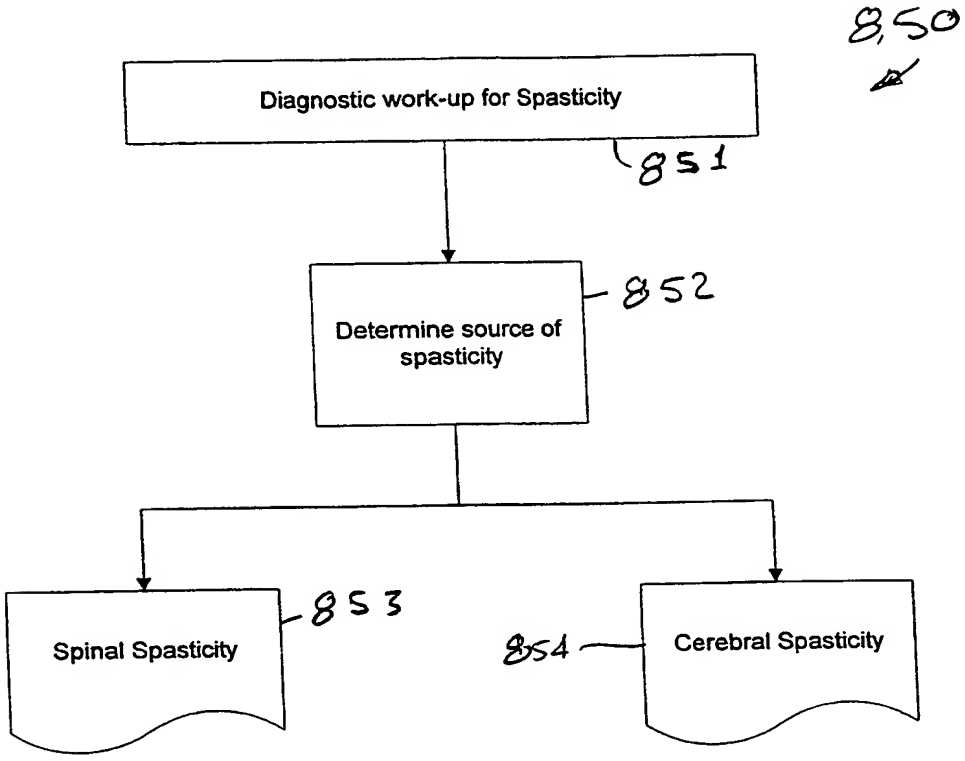


FIG. 9a

Intended as Guidelines Only.

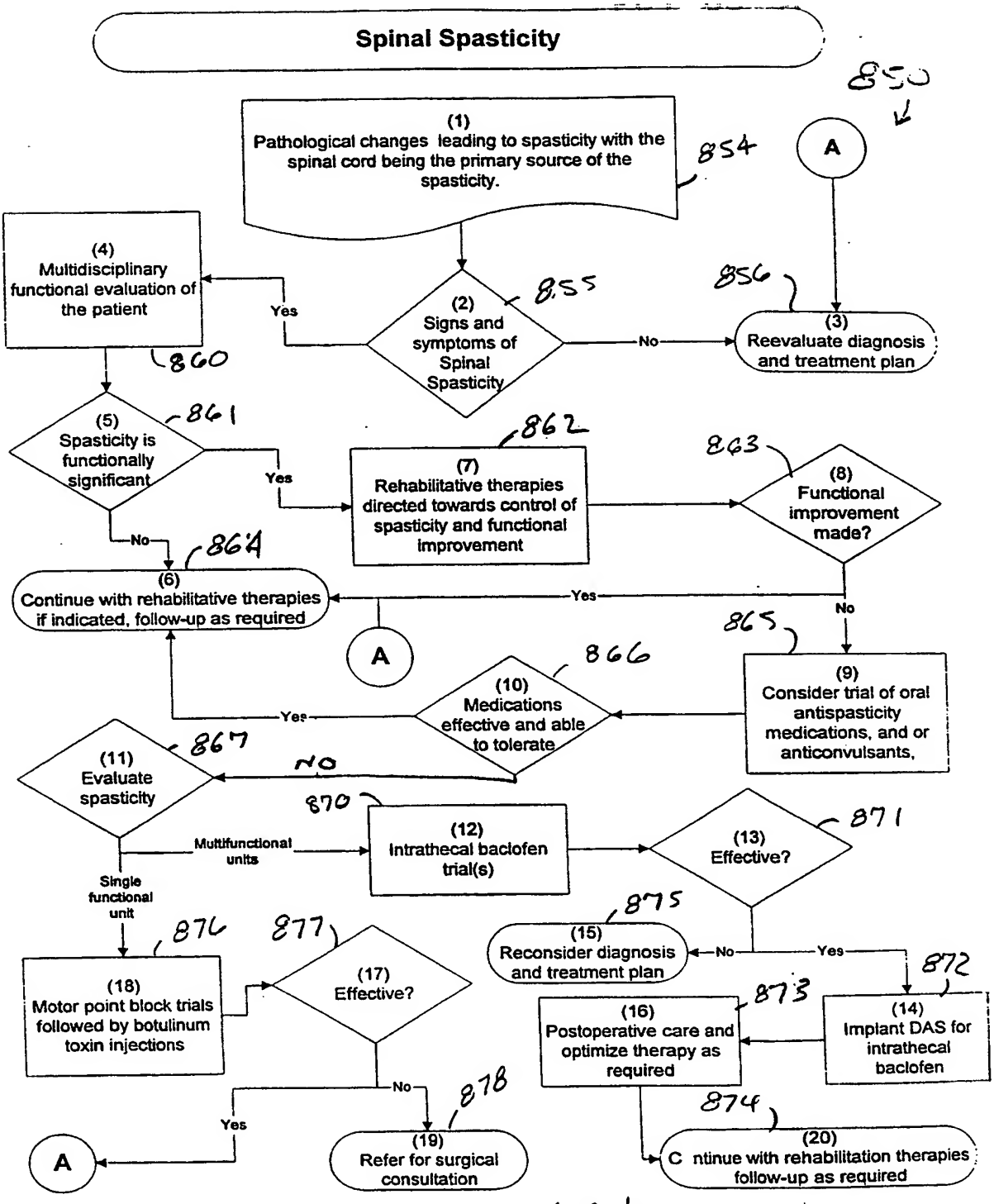
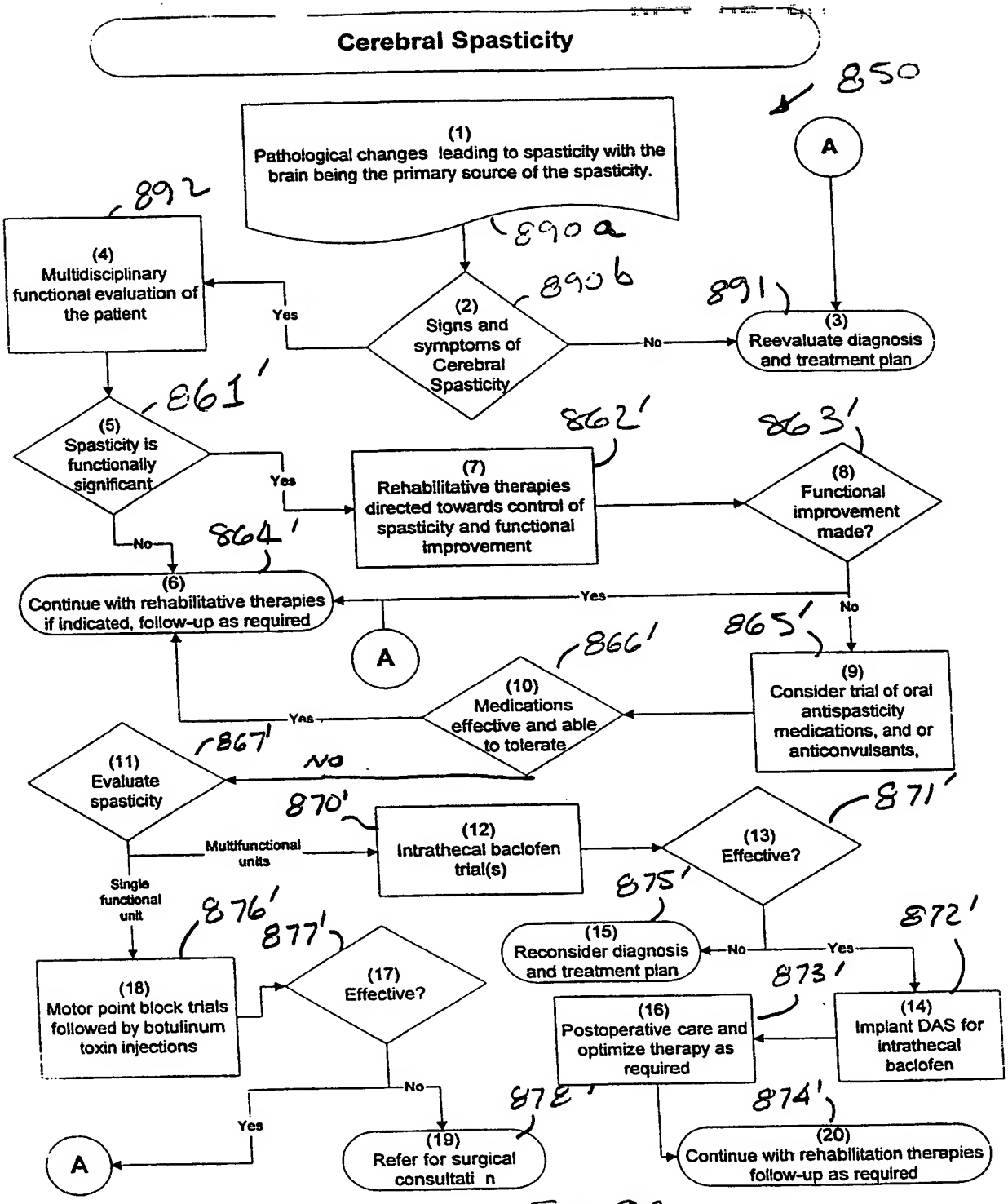

Spinal Spasticity
850
(1) Pathological changes leading to spasticity with the spinal cord being the primary source of the spasticity.
854
A
(2) Signs and symptoms of Spinal Spasticity
855
Yes
No
856
(3) Reevaluate diagnosis and treatment plan
(4) Multidisciplinary functional evaluation of the patient
860
(5) Spasticity is functionally significant
861
Yes
No
862
(7) Rehabilitative therapies directed towards control of spasticity and functional improvement
863
(8) Functional improvement made?
Yes
No
864
(6) Continue with rehabilitative therapies if indicated, follow-up as required
A
865
(9) Consider trial of oral antispasticity medications, and or anticonvulsants,
866
(10) Medications effective and able to tolerate
Yes
867
(11) Evaluate spasticity
NO
Multifunctional units
Single functional unit
870
(12) Intrathecal baclofen trial(s)
871
(13) Effective?
875
(15) Reconsider diagnosis and treatment plan
No
Yes
872
(14) Implant DAS for intrathecal baclofen
873
(16) Postoperative care and optimize therapy as required
874
(20) C ntinue with rehabilitation therapies follow-up as required
876
(18) Motor point block trials followed by botulinum toxin injections
877
(17) Effective?
No
Yes
878
(19) Refer for surgical consultation
A
Intended as Guidelines Only.

FIG. 9b



Intended as Guidelines Only.

Fig. 9c

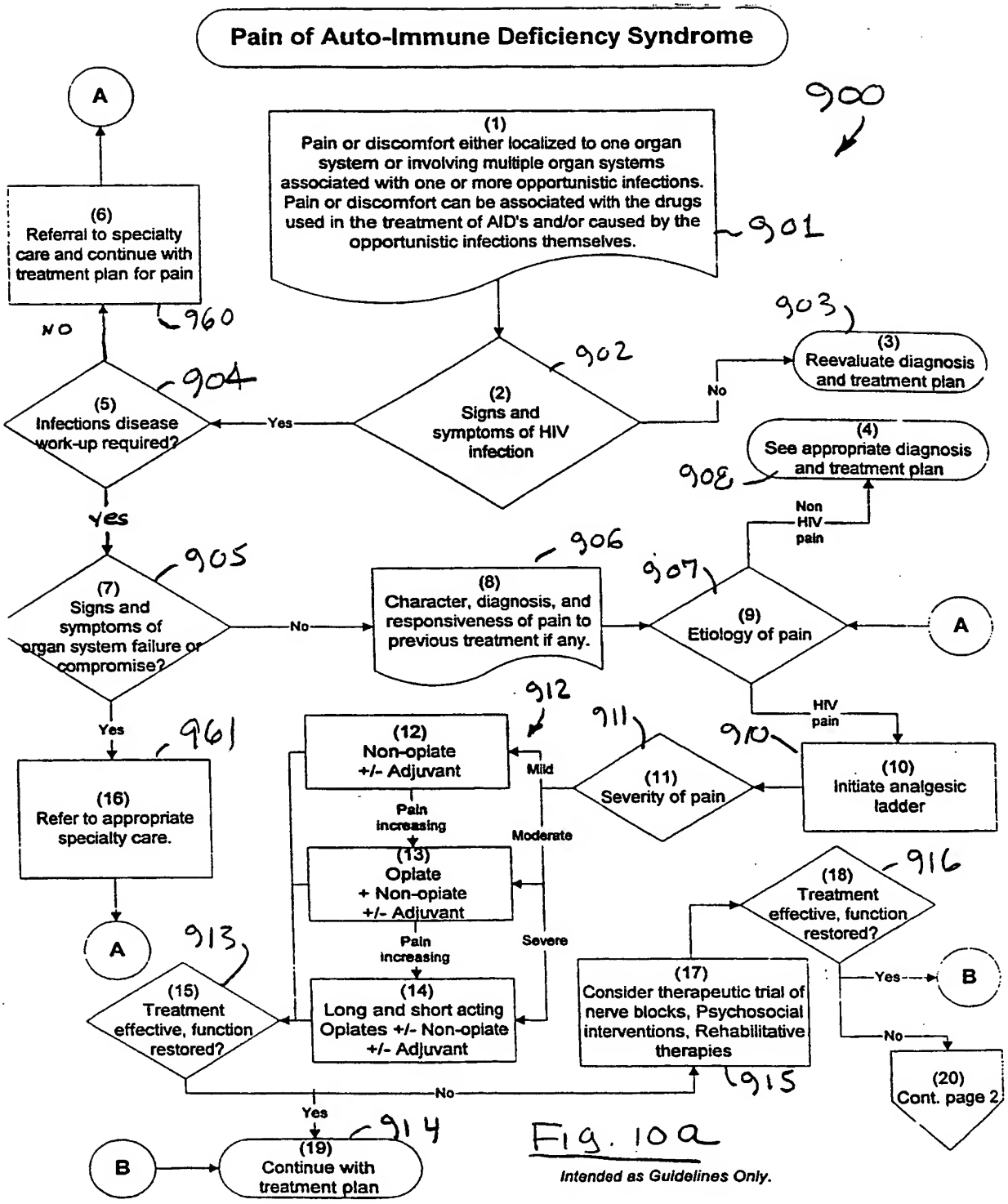


Fig. 10a

Intended as Guidelines Only.

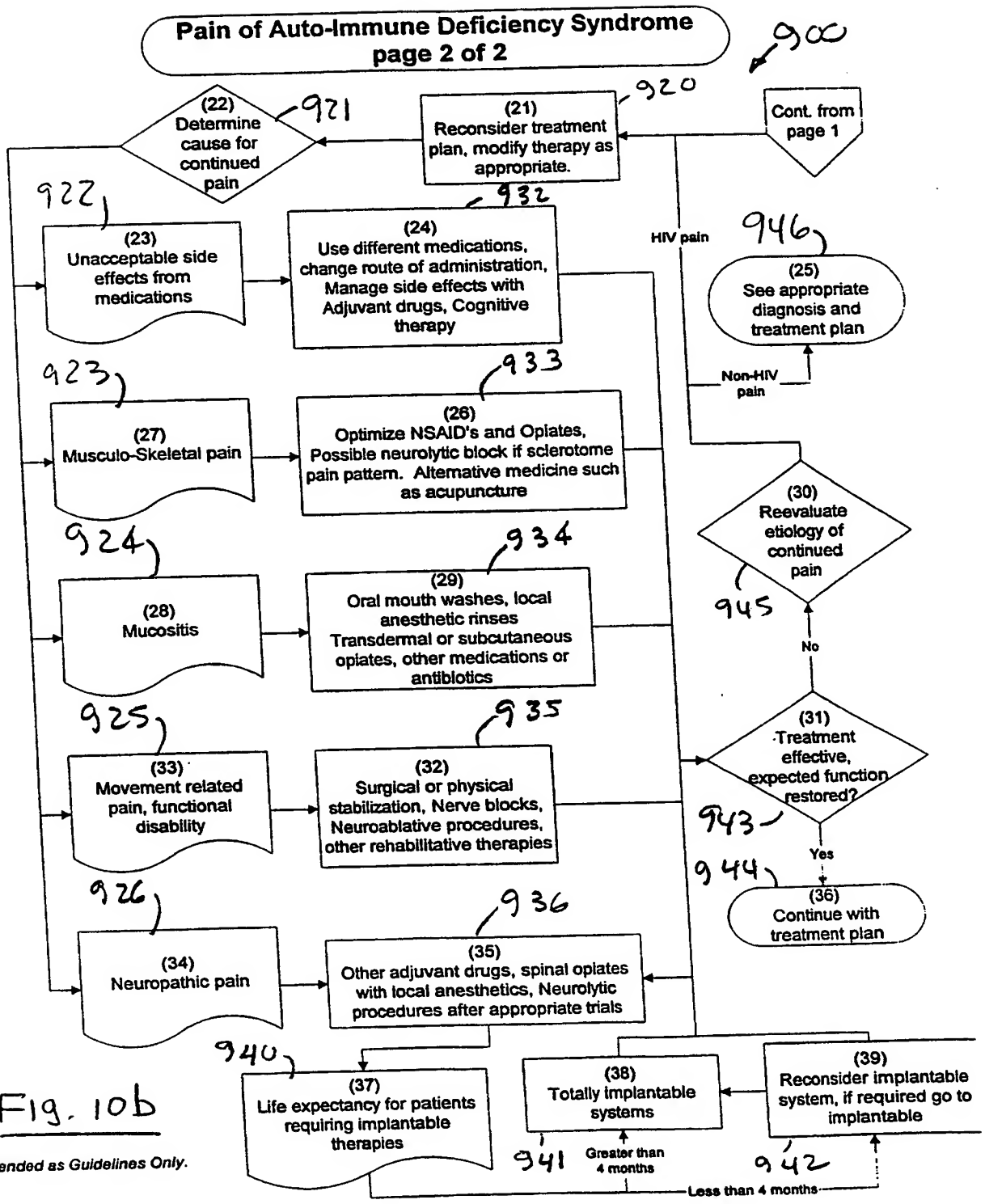


Fig. 10b

Intended as Guidelines Only.

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 :
G06F 7/00, 7/04, 7/20

A3

(11) International Publication Number: WO 99/16407

(43) International Publication Date: 8 April 1999 (08.04.99)

(21) International Application Number: PCT/US98/20239

(22) International Filing Date: 29 September 1998 (29.09.98)

(30) Priority Data:
08/940,064 29 September 1997 (29.09.97) US

(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application
US 08/940,064 (CIP)
Filed on 29 September 1997 (29.09.97)

(71)(72) Applicant and Inventor: ROSS, Edgar, L. [US/US]; 26300 Bernwood, Beachwood, OH 44122 (US).

(74) Agent: SKLAR, Warren, A.; Renner, Otto, Boisselle & Sklar, P.L.L., 19th floor, 1621 Euclid Avenue, Cleveland, OH 44115 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

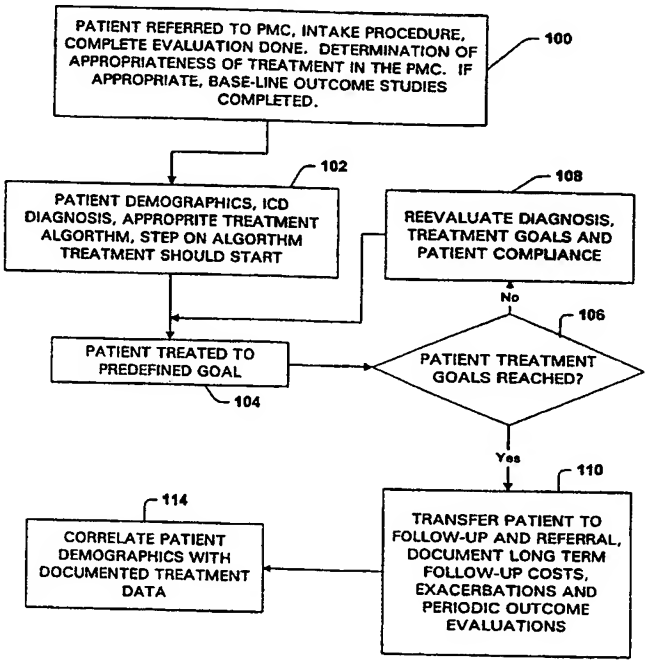
Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(88) Date of publication of the international search report:
22 July 1999 (22.07.99)

(54) Title: METHOD AND SYSTEM FOR PAIN MANAGEMENT

(57) Abstract

A system and method for facilitating chronic pain management. A methodology is employed which includes determining the type of disease or chronic pain a patient is suffering from. A determination is made as to what treatments the patient has already undergone in treating the disease and/or chronic pain and what treatments the patient needs. Based on the above determinations, the present invention formulates a treatment plan for the disease and/or chronic pain and employs historical data to forecast the likely outcome of the treatment plan, the length of the treatment, the associated costs and risks along with the log-term costs, patient function and the effectiveness of long-term therapy and the ongoing supportive needs of the patient (104).



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/20239

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6) : G06F 7/00, 7/04, 7/20
US CL : 705/2, 3
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 705/2, 3

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---- Y	US 5,301,105 A (CUMMINGS, JR.) 05 April 1994 (05.04.1994), columns 4-11, 13, 14 and figures 1, 4, 9, 11.	1-4, 6-13, 15-20 ---------- 5, 14
Y	US 5,583,758 A (MCILROY et al.) 10 December 1996 (10.12.1996), columns 2, 11, 16, figures 19-20.	5, 14
A	US 5,225,976 A (TAWIL) 06 July 1993 (06.07.1993).	1-40
A	US 5,359,509 A (LITTLE et al) 25 October 1994 (25.10.1994).	1-40
A	US 5,619,991 A (SLOANE) 15 April 1997 (15.04.1997).	1-40

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
12 APRIL 1999

Date of mailing of the international search report
26 MAY 1999

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231
Facsimile No. (703) 305-3230

Authorized officer
LAURA H. PLUTA James R. Matthews
Telephone No. (703) 305-3900

Form PCT/ISA/210 (second sheet)(July 1992)*

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/20239

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,262,943 A (THIBADO et al.) 16 November 1993 (16.11.1993).	1-40
A	EDLIN, MARI. "Behavioral Health Software Attract Attention" Health Management Technology, December 1996, pp. 34-37.	1-40
A	WENNER, ALLEN R., M.D., "Using Interview Software for Early Recognition of Behavioral Illness" Proceedings: Toward An Electronic Patient Record '96, Ambulatory Systems, 1996, pp. 301-307.	1-40